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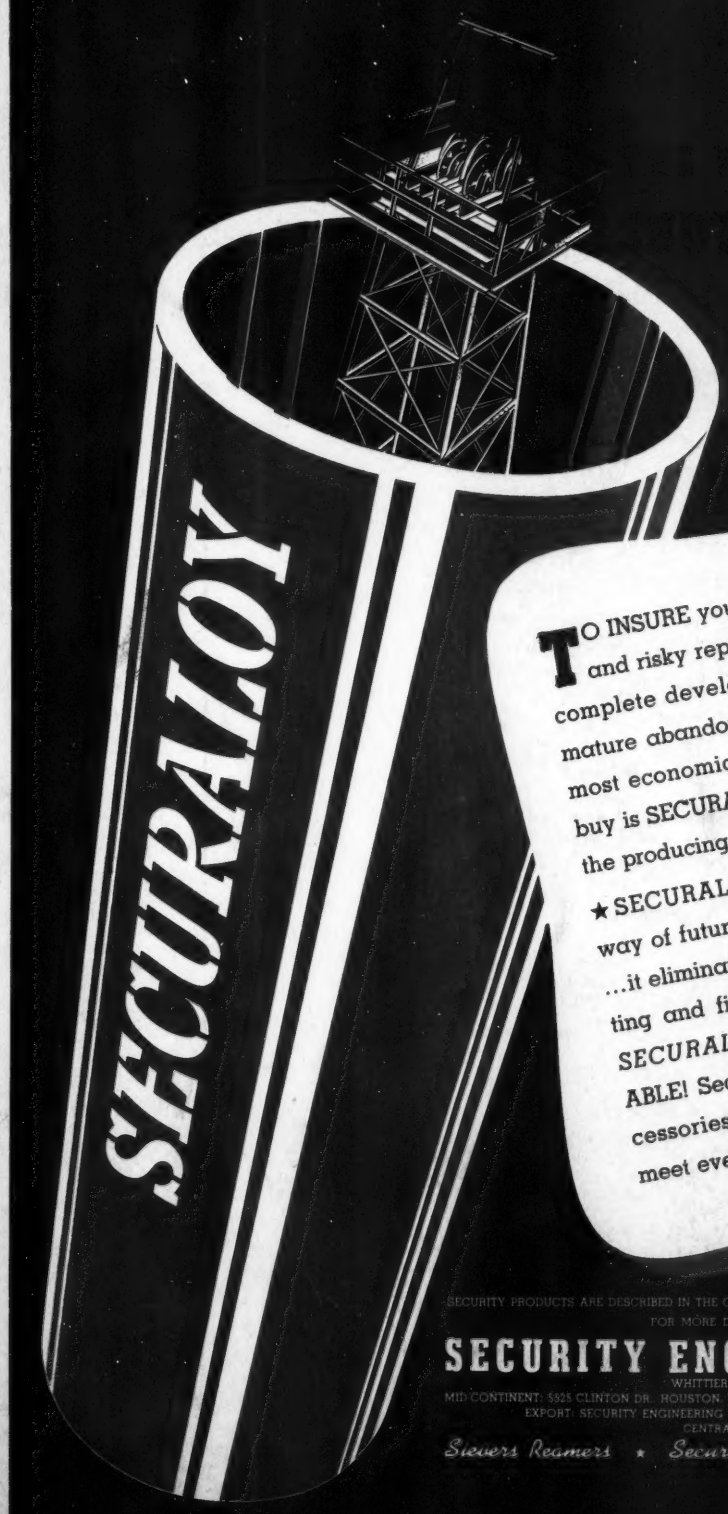

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Pioneering of Rotary Drilling in California

A Driller Reviews Early Days

A. P. I. Pacific Coast
1940 Spring Meeting

By L. B. Little
Standard Oil Co. of California

Before going into the matter of the introduction of the rotary method in California, I would like to go back a little beyond that time. As far as I am able to learn, the first rotary outfit was built by the American Well Works Company, of Aurora, Ill., in the early eighty's. The rotary equipment was first used, as far as I am able to ascertain, in the drilling of water wells in the Gulf Coast Country; and later it was used in the drilling for sulphur in the Gulf Coast Country; and of course later it was used in the drilling for oil, and has been used practically exclusively in drilling for oil in the Gulf Coast since that time.

I was a rotary driller in the Gulf Coast Country at the time my present employer decided to try out the rotary method in California and, incidentally, sent a representative to the Gulf Coast to hire six rotary drillers and to purchase three complete rotary outfits. It so happened that I was one of the fortunate ones to be selected.

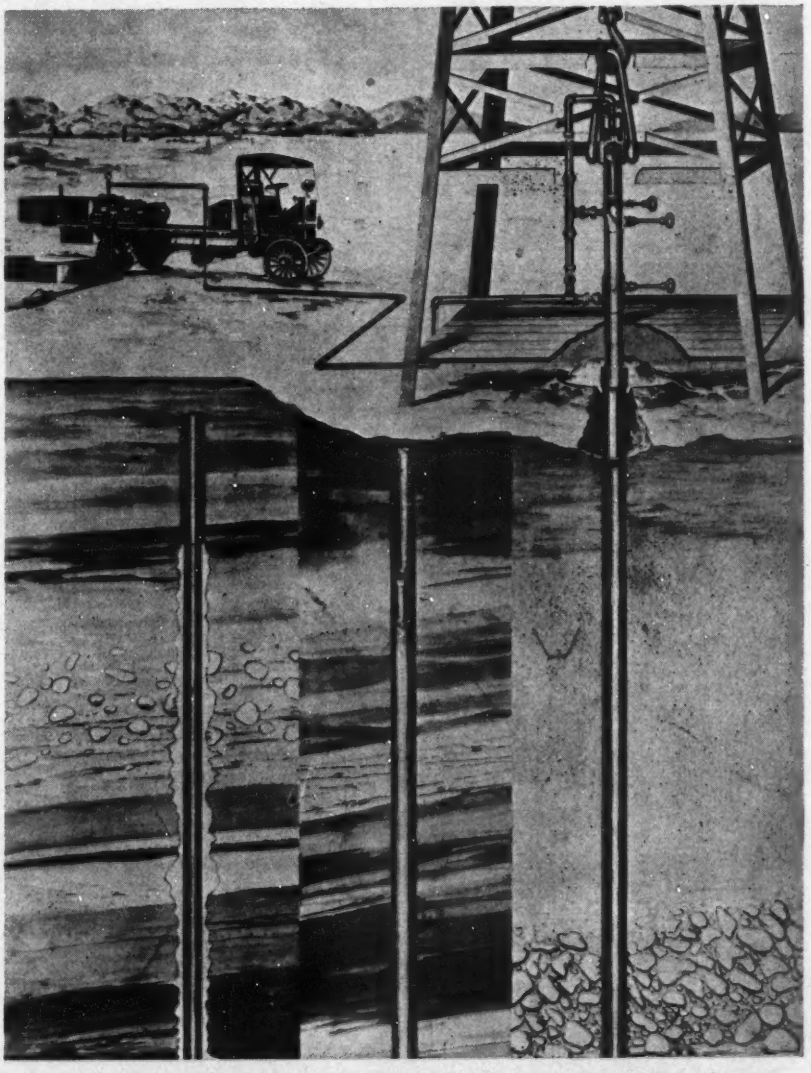
When the rotary was brought into California there was considerable difference of opinion among operators as to its adaptability to conditions here in California.

There were a number of reasons for such differences of viewpoint. Probably first—was the normal human reaction to any big change from existing practice. Probably next—was the explainable concern of those who thought that if the rotary replaced the cable tools they would be out of the picture. Another reason was a definite and sincere skepticism on the part of the operators and field organizations as to the actual suitability of the rotary method to California conditions. Many contended that the rotary method would mud up the oil sands and spoil the wells. This was demonstrated to not be the case. Incidentally, we still hear discussions along this line.

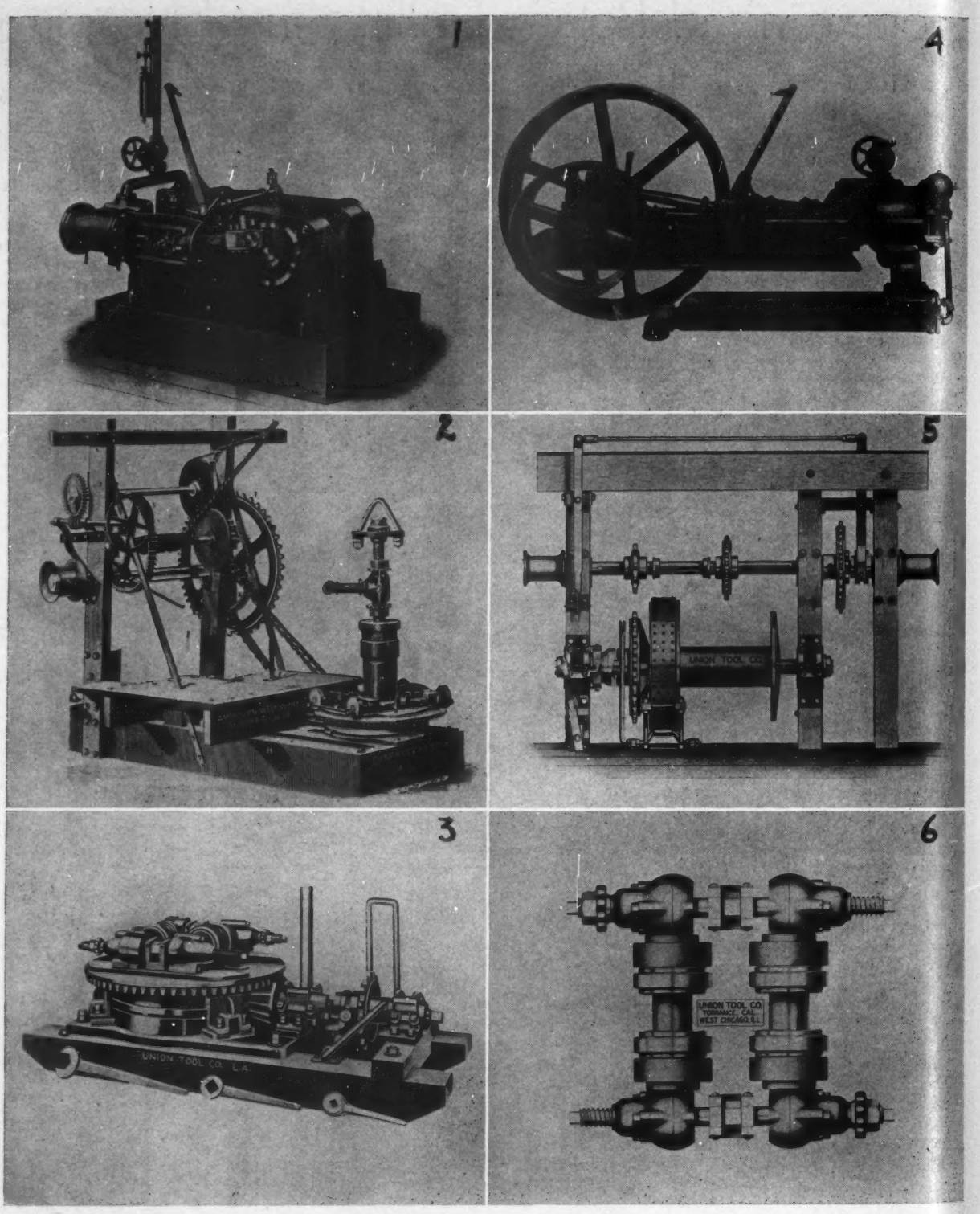
As a result there was a transition period from the time rotary was introduced into California until it was generally accepted. There was the expected period of adjustment. The terms "Swivel Necks", "Hard Heads", "Long Horns", were used in referring to the rotary men; and similarly the terms "Mail Pouchers", "Up and Downers", etc. were used in referring to the cable men.

After a couple of years of this squabbling or wrangling, the personnel of both methods awakened to the fact that both methods were essential to get the required results. So characteristic of the oil men of that day they buckled down, put their shoulders to the wheel and put the thing over. Rotary could do some things the cable couldn't do and vice versa. In other words, rotary could make hole and possibly fight pressures encountered better than the cable, but owing to lack of power, or lighter equipment, it required cable tool equipment to handle what was considered long strings of pipe, for instance 2000 feet of 10" or 2500 feet of 8⅝".

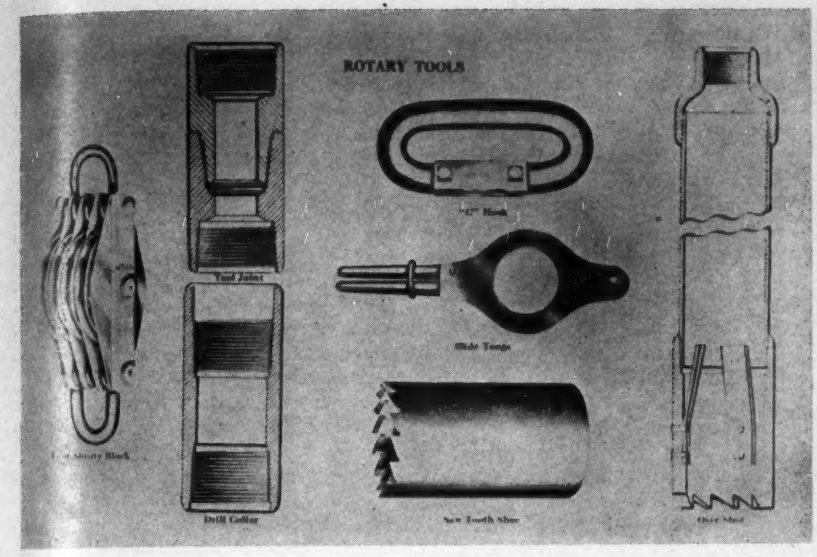
Prior to the rotary's coming to California and for the first couple of years here the drilling crews worked straight days and nights, the day driller being the boss of the rig. The day driller usually hired the night driller as well as the rest of his crew—in fact the day driller was the whole show. He was given the rig and a location to drill on, and he drilled the well, found the oil, landed the pipe, etc. In many instances the method used by the driller in finding oil was similar to that of the amateur typist running a typewriter, i.e. by the hunt and peck method. The driller had to catch samples from the overflow pipe or from the mud ditch and hunt and pick and look for the oil sand. In many instances wells were completed without ever seeing a grain of oil sand—just a smell.

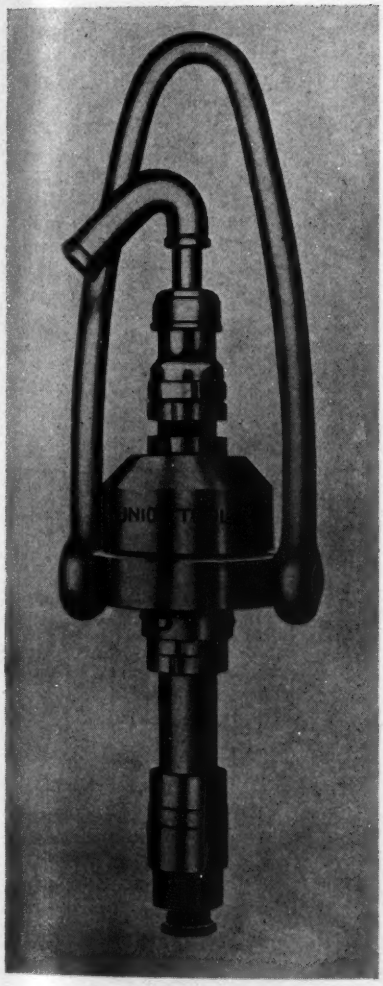


On March 15, 1910, Almond A. Perkins cemented the first well in Maricopa District with this outfit. This was the day that the famous Lakeview gusher blew in. Thirty years later, to the day, the company founded by Perkins was sold to another famous pioneer in oil well cementing, Halliburton.



Do you remember these? Identified by numbers they are: 1. Twin engine which was the last word in 1910. 2. One of the first rotary outfits built in the early 1880's by American Well Works Co., in Aurora, Ill. 3. Here is a rotary table of 1910. Note the grip ring which was later replaced by the modern kelly bushing. 4. This one-cylinder engine served as boiler feed pump as well as prime mover for the rotary and cable tools. 5. How does this 1910 drawworks compare with the super-super jobs of today? 6. Here is the grip ring, invented by Cy Bell, which left its mark on many a joint of drill pipe serving as a kelly.





Compare this 35-ton swivel to the 350-ton swivels in use today.

The rotary outfits we had in those days were very small and light. For instance we used as the prime mover a 9x10 single cylinder steam engine, 8x5x10 mud pumps about the size of a boiler feed pump on a modern boiler plant, line shafts were about 2⅞" in diameter and the drum shaft usually about 3½" to 3⅞". The drums were equipped with a single brake flange and the brake bands usually used were 3" to 4" wide. We had no brake blocks at that time—the brake flange and the brake band had metal to metal contact, and naturally the steel dust was flying into the driller's and the rest of the crew's eyes all of the time.

The boiler plants we used generally consisted of one to two 40 h.p. tubular boilers, maximum steam pressure about 100 lbs. The rotary table was of the grip ring type—the top joint of the drill stem was used in the same manner as the Kelly or square stem is today. This grip ring assembly was made in a manner to form a square on top of the rotary table and a series of grip rings quartered in the assembly. I will explain this more fully later on.

To drill a well 2800 to 3000 feet deep with the outfits we had in those days required from 60 to 120 days, depending on the difficulties encountered in the way of twist-offs, blow-outs, etc. Fishing jobs were plentiful and difficult. Every fishing job practically meant a wash-over or a side-tracking job. The packer overshot had not been developed and the technique of using crude oil to circulate drill pipe was not yet thought of.

We had no electricity in those days on the drilling wells. We used what was known as a "stink pot" for lights—two or three hung on the girt of the derrick and one in the derrick for the derrickmen. In some instances where natural gas was available we ran a line into the derrick and lighted a flare.

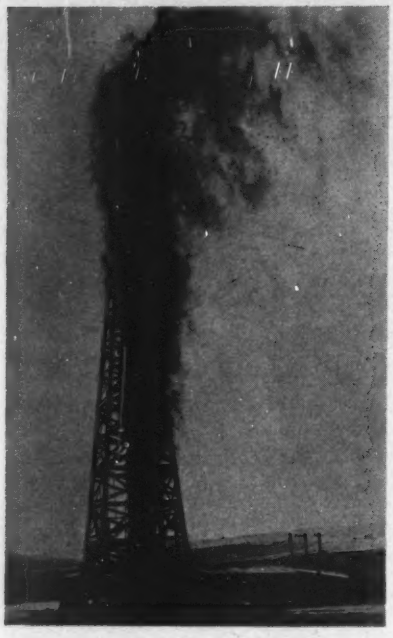
A relic of the grip ring rotary drilling days. This scarred old grief stem now does duty as a door frame at Standard's 11-C Camp at Bakersfield.

The art of studying mud weights was never thought of in those days and the mud fluid probably ran from 20 to 30% sand. The only sand shakers we had were the rough necks on the business end of long handled shovels, keeping the sand and shale out of the mud ditch.

In the early development of the Buena Vista Hills, North Midway, and Maricopa districts we had plenty of grief. There was a gas cap with high pressures above the main oil producing zones, as well as plenty of pressure in the oil zone, and at comparatively shallow depths ranging from 2000 to 2500 feet. I have seen as high as 1800 to 2000 lbs. shut-in pressures on wells in these areas. Blow-outs were frequent. The blow-out preventers we had in those days were an abortion—they were better off than on.

Everything was horses and mules in those days. The field supervisory force

looked after their work with a team of horses or mules and a buckboard. In those days they hauled more equipment and supplies to the well with horses than they do today with the modern trucks.



There were gushers in those days. Some of the oldtimers got out of control and spilled millions of barrels of oil into hastily excavated storage or into ravines. This is Standard's KTO No. 39, north of Taft.

In the early development of the rotary method here in California we would drill a hole to the approximate point of landing with rotary, rig up cable tools and run the casing with an open end shoe. Up until that time we had not developed the guide for the shoe and the casing would fill up on the inside with mud and cuttings, etc. We would clean out with tools through the casing and make a few feet of small hole ahead of the casing and drive the shoe of the casing into the tight hole for the purpose of shutting off the water. There are many wells producing clean oil today that had that type of shut-off.

Also, another method we used instead of drilling a small hole and driving shoe into it, and before the development of the hydraulic method of cementing, we would dump cement into the bottom of the hole with a dump bailer, pull the casing up 20 to 30 feet and fill it up with water, screw a solid plug into the top of the casing, and let it down, forcing the cement out around the shoe of the casing —provided the casing didn't freeze up before we could do this operation. The cement we used then was very inferior to what we have today and after cementing a well we generally let it stand for about three weeks to let it harden. Today we let them stand for three days instead of three weeks.

Needless to say, the outfits we had in those days were very inefficient. The oil operators realized that something had to be done about it, and as the old saying goes, "Necessity is the mother of invention", and along about the latter part of 1910 the oil operators and the manufacturers began to get together for the purpose of building bigger and better equipment; and they did build bigger and better equipment—at least we thought so.

Very little had been accomplished up until about the middle of 1910, particularly with the rotary. About that time we began to get some improved equipment.

Internal upset end drill pipe was developed and that helped a lot. Then we developed the four-way bit for reaming the mud off the walls of the hole.

The flow beans were put into use in 1911 and the gas traps came about the same time. The oil separators were developed.

The electric dehydrators came in 1911 or 1912.

The rotary underreamer was developed. However, it was a crude affair and after leaving a number in the holes, it was discarded.

Along about that time we were doing some pressure drilling. However, it was with the cable tool method.

The perforated pipe we were using then was of the round hole type—anywhere from 3/16" to 3/4" holes. It was the thought then that a well had to make sand to be a good well. Some of the wells then made thousands of tons of sand.

The art of drilling wells in with the perforated pipe on the bottom of the drill stem was put into practice in 1910. Had it not been for this method of drilling the wells in, we probably would have been delayed a couple of years longer in getting some of the wells completed, as it would have been necessary to let them blow out a number of times until the pressure was reduced enough to permit pulling out and going in hole with drill pipe or perforated pipe.

Everything was improved along about that time except the bit and the blow-out-preventer. For twenty years after the rotary was brought into California, we continued to use the old fishtail bit.

Walworth Executive Views California Fields

F. H. Morehead, vice president in charge of engineering, of Walworth Co., is touring the oil fields of California in an extensive three-weeks survey of drilling and producing activities as well as refinery expansion work.

A.P.I. Engine Sub-Committee Meets at Long Beach

The American Petroleum Institute, California District Sub-Committee on Gas Engine Maintenance has a meeting scheduled for Apr. 18 that will be of interest to all persons engaged in oil field drilling and production activities. The meeting will be held in the Shell Hall, located on the corner of Hill and Obispo Streets, Long Beach, and will start at 7:30 p.m. The entire oil fraternity is invited to attend. Arrangements are being made to accommodate 500 people as this new subject handled by such an authority as Mr. Schaefer will draw a large attendance.

The subject for this meeting is "Hydraulic Drives" being a discussion of the performance, construction, and application of hydraulic couplings and torque converters when applied to internal combustion engines for industrial and oil field use. The speaker is Robert M. Schaefer, manager of the Hydraulic Department of the Twin Disc Clutch Co. of Racine, Wis. Mr. Schaefer is well equipped to handle this subject as he has had personal charge of the development of this equipment in his company's laboratory from patent rights obtained some years ago. He is an authority on internal combustion engines as well. Mr. Schaefer will use 50 slides in the presentation of this paper, and as his diction is good he will put this subject to his audience in an understandable and comprehensive manner. The paper will not cover the application of this equipment in automotive service.

South Rosecrans Activity Increases

Definitely on the increase is activity in the south Rosecrans area where five new derricks have been recently erected.

First of the new crop was Howard Oil's No. 2, located south of No. 1 which discovered the extension production. The project will be a joint venture with The Caminol Co. which is furnishing equipment.

Rainbow Drilling Co. is planning to move an outfit from Montebello to Duncan No. 1, derrick for which is completed south of Compton Blvd. and east of Maple Ave.

West of San Pedro St. and north of Compton, Chicago Oil Co. is rigging up, as is Midfield Oil Co. one location to the north. The fifth new project is Southern California Petroleum Corp.'s Slabaugh No. 2 which is drilling at 2000 ft. after skidding rig and equipment from Rowena No. 1.

Apex Petroleum Corp.'s southerly outpost deepened to 9214 ft. and plugged to 8655-8685 ft. obtaining a small flow.

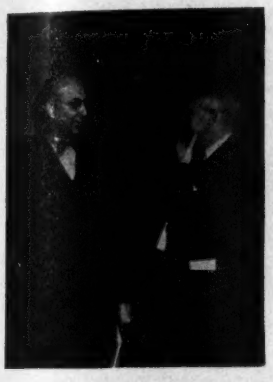
A. P. I. Pacific Coast Spring Meeting Draws

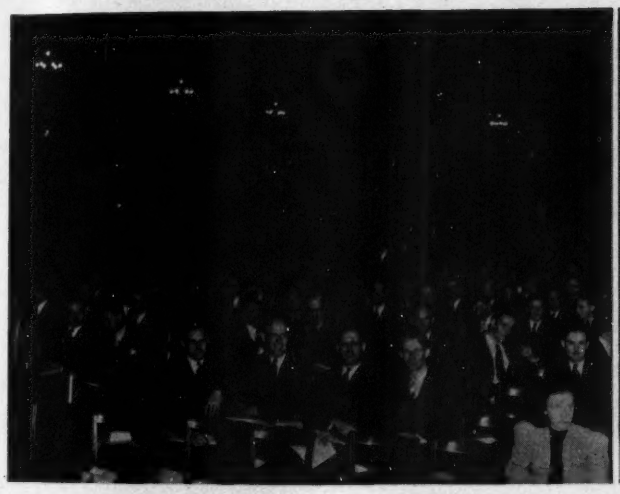
Record Breaking Attendance in L. A.

A record breaking attendance which overflowed the crystal ballroom of the Biltmore Hotel in Los Angeles attested to the growing interest of Pacific Coast oil men in discussion of methods and equipment in drilling and production, Mar. 19, when the American Petroleum Institute held its 1940 District Spring Meeting.

With one exception, copies of the papers presented at the meeting were distributed. Brief summaries of these presentations are given in these columns for those who were unable to attend. The paper on "Practical Utilization of Rate-of-Penetration Drilling Data", by C. A. Yeatman, of Shell Oil Co., Inc., Los Angeles, is to be presented at the Mid-Continent District meeting later, and for that reason was withheld from distribution. The author's abstract follows:

"The importance of 'rate of penetration' achieved during drilling as a clue to a classification of the type of formation being penetrated has been recognized for some time. The reduction of this factor from a casual observation to a strict measurement has definitely increased its value not only as an indicator of the type





of formation being penetrated by the drill but also as an aid in the development of more economical drilling technique".

Designed by Mr. Yeatman, the equipment for obtaining a graphic record of

Howard Pyle

rate-of-penetration data is now on commercial production by one of the industry's tool makers.

"Oil Well Cementing Factors Influencing Bond Between Cement and Formation", by P. H. Jones and Denis Berdine, of Union Oil Co., Wilmington, is abstracted as follows:

"Cement channeling and factors influencing the bond between set cement and formation were investigated in a series of 42 tests using relatively large-scale apparatus simulating conditions prevailing during the cementing of oil wells. The results which are presented photographically show that mud cakes will persist between set cement and permeable formations unless specific means, such as hydraulic jetting, mechanical scraping, or chemical action are employed for their removal".

Conclusions of this investigation were summarized as follows:

Channeling and chimney formation of cement in the annulus is unlikely in the immediate region of the shoe, but may occur near the top of the cement column.

Wherever cement slurry is applied opposite formations having appreciable permeability, a residual mud cake will remain between the set cement and the formation unless specific means are employed to effect its removal. The presence of collars, movement of the casing, or circulation of water may reduce the thickness of the mud cake slightly, but will not remove it completely.

Where the casing rests against the walls of the hole, residual cakes will be thicker than normal. There is a tendency for the cement slurry to be excluded from such regions of proximity, thus leaving longitudinal stringers of mud cake with no cement between the casing and the formation.

Three methods were found to be effective in removing mud cakes: 1. Hydraulic action by direct impingement of fluid jets (such as that induced by downwhirler shoes) against the walls of the hole. 2. Mechanical scraping by using suitable mechanical devices on the casing, and alternately raising and lowering the casing. This is effective only over areas where scrapers or scratchers make a bearing on the wall of the hole. 3. Acid treatment gave best results under atmospheric pressure conditions. Laboratory tests at high pressure indicate but do not prove that effective mud cake removal under these conditions may be obtained.

L. L. Aubert

"The Application of Chemicals to Drilling and Producing Operations," by W. W. Robinson, of The Texas Co. of California, is abstracted by the author as follows:

Without elaborating upon the details of any one type of development, this paper considers broadly the steadily growing trend in the application of chemicals to problems affecting the drilling for, and production of oil. Chemicals for the treatment of muds, the control of heaving shales, treatments for lost circulation, special cements, the use of acid, selective water shut-offs, and the application of surface tension reducing agents are reviewed in their relationship to the growing chemical technology which has already been of material assistance to the driller and producer.

Among the early problems tackled by the chemist in the drilling art, says the author, was that of "breaking" of drilling muds with the separation of free water and the rapid settling of solids. A

P. H. Jones

collodial clay, bentonite, solved this difficulty. It was found that by adding from 2 to 5 per cent of bentonite to a mud-laden fluid with a suspendable clay base, a drilling fluid could be built up which would resist a majority of the changes which had formerly caused the solid and liquid phases to separate; and at the same time materially improve its wall building and lubricating properties. Other means, the author continues, sought to improve the suspending capacity of a mud included a national clay treated with 5 per cent by weight of sodium silicate and 3 per cent by weight of ammonium, barium or calcium chloride; or the use of a salt brine in which is suspended a fuller's earth of the Florida-Georgia type.

The development of weighting materials such as barium sulphate and iron oxide brought new significance to the role played by mud and resulted in a tool which has received wide application, Mr. Robinson continues. Among factors which contribute to the increase of viscosity of the drilling mud are: accumulation of solids, base exchange, loss of deflocculating agents, presence of flocculating agents in natural water of formation drilled, temperature, and increased collodial dispersion and hydration of natural clays and shales. Most of these difficulties can be controlled, or overcome, by the use of various chemicals—particularly those spoken of as deflocculating agents.

Among the deflocculating chemicals described by the author are the following:

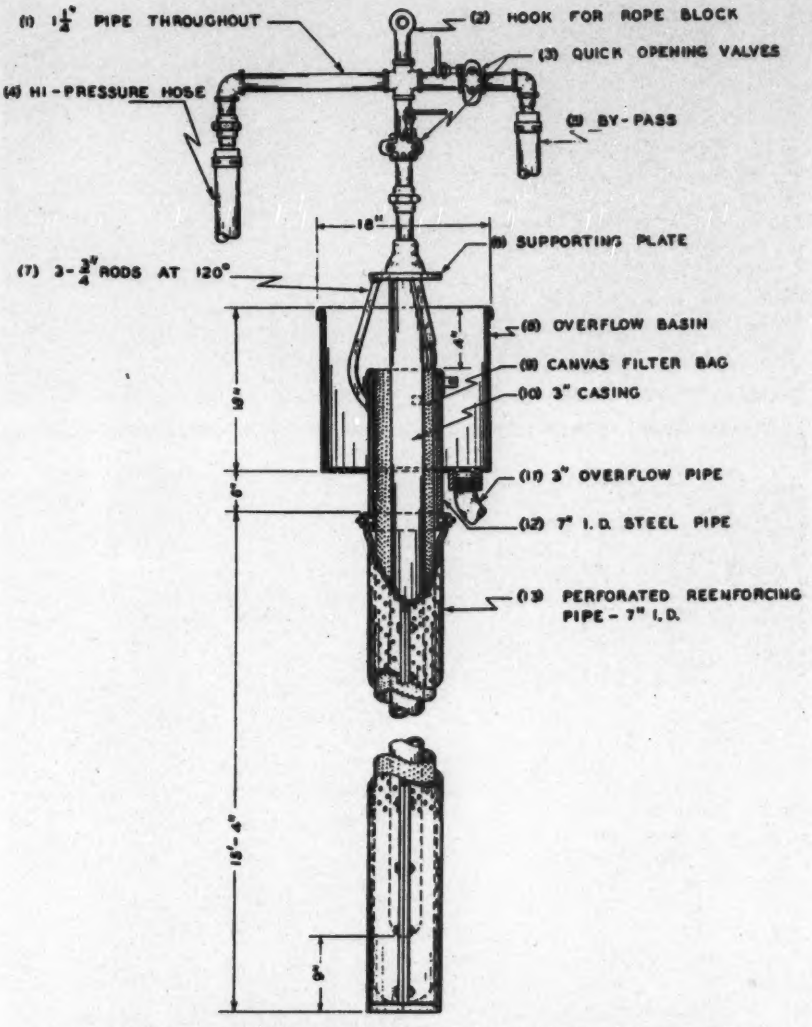
Sodium Hydroxide: This material is also used occasionally to control mud alkalinity and is applied as a 5 per cent solution by dissolving 20 pounds of commercial flake caustic soda in 50 gallons of water. It is also used to prepare sodium tannate by using one half of 2 pounds per pound of quebracho or chestnut extract. Sodium Carbonate: This has been used to control the alkalinity of mud and to counteract free lime in cement-cut muds. In the ratio of 1 pound per barrel of water it is used to make mud from disintegratable shales. In certain cases it may prove helpful in the reduction of viscosity.

Sodium Bi-Carbonate: This is helpful in treatment of cement-cut mud. Concentrations start with 2 pounds per 50 gallons of water. Sodium Silicate and Meta Silicate: Small amounts will deflocculate most muds while large amounts will cause flocculation. Usually less than 1 per cent will deflocculate. Along with its deflocculating action the silicate contributes to mud alkalinity. Sodium silicate in a wide range of proportions of sodium oxide-to-silica. The two most popular types are made up of 8.9 per cent sodium oxide and 29 per cent silica; and 28.9 per cent sodium oxide and 28.1 per cent silica respectively. Another combination with 14.5 per cent sodium oxide and 29 per cent silica is finding use in combating heaving shales.

The reduction of gas cutting in a mud has been noted when small amounts of ethyl alcohol, isopropyl alcohol, isoamyl alcohol and various esters and ketones are added to the mud stream. These chemicals reduce the surface tension of the mud.

A relatively new innovation, the author continues, in the chemical treatment of mud has been the application of complex phosphates. Normal phosphates such as tri-sodium phosphate and di-sodium phosphate act more like alkalies while the complex forms from which water has been removed by heat have sharp deflocculating effects. Different complex phosphates have varying degrees of alkalinity and varying rates of reversion to other phosphate forms, but most of them not only deflocculate but have the added advantage of suppressing the formation of insoluble calcium and magnesium compounds and bind up soluble calcium compounds in such a way that their thickening effect on a mud is more controllable. Among these phosphates listed by the author are sodium hexa-meta phosphate, sodium tetra-phosphate, and tetra-sodium pyrophosphate.

One of the most prominent methods of controlling heaving shales is by the use of a drilling fluid containing a substantial amount of sodium silicate. An explanation of the action of silicate mud is based



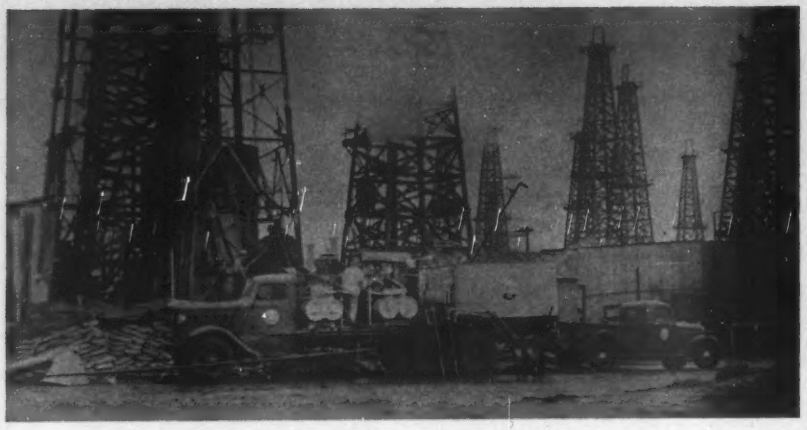
Detail of test well discussed in "Oil Well Cementing Factors Influencing Bond Between Cement and Formation".

on work indicating that heaving shales tend to keep the water in contact with them (from drilling fluid) at a pH of 7 to 9. Silicate drilling fluids have a pH of approximately 11. The buffering capacity of shale tends to reduce the pH of the mud, precipitating silica gel to form a protective coating over the shale. The presence of common salt in the silicate fluid adds to its effectiveness.

Another type of treatment for heaving shale is based on the fact that shales contain the chlorides, sulphates and nitrates of sodium, calcium and magnesium, minute crystals of which are found through shale bodies. As the shale becomes wet with water from the drilling fluid these salts go into solution and osmosis is thought to occur with the rapid movement of water from the mud to pockets of solution within the shale. To overcome the penetration of mud-water into the shale the dissolved solids content of the water phase of the mud is increased by the addition of calcium chloride, magnesium chloride and/or the sulphates and nitrates of calcium and magnesium, thus checking the osmotic effect by eliminating the drawing force required to draw water into the shale.

The desire to prevent the penetration of water from the drilling fluid into low pressure sands with the attendant danger of fluid-lock has stimulated the application of oil-base drilling fluids. Some of these fluids are water-in-oil emulsions, while others appear to be made up of selected oil-wettable solids suspended in a heavy oil base.

Another trend in the drilling of low pressure sands, and in some cases even high pressure sands, has been the addition of powdered limestone to ordinary clay drilling fluids to impart an alkalinity reactible with inhibited hydrochloric acid. The mud cake made by such a mixture can be easily removed with acid and the face of the sand cleaned more thorough-



Pacific was cementing in the rain at Dormax No. 2 in Long Beach when the cameraman passed by.

Federal Oil Co. is testing in Inglewood and interested in the proceedings are, left to right, J. W. Hawn, of S. M. Brooks' crew; J. E. Riley, production foreman of The Texas Co., and A. J. Peterson, of Security Engineering.

ly. Carbonate mud is also useful throughout the course of drilling in that in the event of stuck tools acid can be applied.

The maintenance of circulation during drilling is of vital importance and the loss of mud into porous sands, fractured shale bodies, etc., has led to the development of many procedures applicable as agents to plaster or seal off the sections where circulation is being lost. Among the simplest procedures are those which incorporate different coarse or fibrous materials into the mud which may bridge the crevice and allow mud cake to build up. Cotton seed hulls, dry beet pulp in the mud or in gel cement, fish scales, flaxseed, mica flakes, wheatbran, rubber pulp and asbestos have been used with varying degrees of success. The very adhesive gelatinous precipitates obtained by treating sodium silicate with calcium chloride, lime, aluminum sulphate and magnesium silico-fluoride have also been of assistance in regaining circulation. The author also mentions the use of a cement slurry containing hydrated bentonite, and a colloidal solution of sodium alginate, in combating loss of circulation.

Discussing the components of cement the author says: When water is added to

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Cardwell, Drawworks, Well Service Hoists
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Howard Production Crowns
Howard Pumping Units
Hughes Bits—Tool Joints
Kropp Forged Flanges, Welding Nozzles
Link-Belt Rotary Chain, Mud Screens
Manhattan Mechanical Rubber Goods Rotary Hose
Marsh Gauges
Mills Bull Plugs, Swage Nipples
Norris Sucker Rods
Perfection Thread Lubricant
Plant Packings
Ratigan Production Equipment
Raybould Couplings
Red Devil, Valves, Liners, Pump Parts
Reed Bits—Tool Joints
Republic Casing and Tubing
Republic Line Pipe
Republic Merchant's Pipe
Rex Pre-Heaters
Skinner Stuffing Boxes
Stockham Pipe Fittings
Thompson Shale Shaker
T. I. W. Rotary Slips
Titusville Boilers, Rotaries, Pumps, Engines
Tnemec Coatings
Tube Turns Welding Fittings
Unibolt Couplings—Flow Beans
U. S. Electric Motors
Wall Manila Cordage
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cement the tri-calcium aluminate contributes chiefly to the rise in temperature of the slurry and its initial stiffening. The fluidity of a slurry at constant water-cement ratio is affected principally by the di-calcium silicate and next by the tetra-calcium alumino-ferrite. In addition to the role played by coarseness of grain the principal constituent contributing resistance to the effect of high temperature is the tetra calcium alumino-ferrite, with di-calcium silicate second and tri-calcium silicate third. Addition of sodium tannate will lengthen the thickening time of a cement slurry exposed to increased temperature.

The author's discussion of the applications of chemistry in the drilling art covers acidizing and selective exclusion of water at some length.

"Bottom Hole Control of Gas Production," by E. W. McAllister, of Kettleman North Dome Association, is abstracted as follows: "The author describes the design and operation of two general types of bottom-hole flow controls which are adjustable from the surface by means of instruments run on a small wire line. These devices were designed primarily to control the gas-oil ratios of wells in which the gas cap can be segregated from the oil producing sands by means of a packer. The results of a typical installation are shown and discussed and special uses of the instruments are pointed out".

"Trends in Allowables in California," by L. L. Aubert, of Bankline Oil Co., is abstracted as follows: "The continuance of a healthy condition in the California petroleum industry during 1940 will require the maintenance of the state allowable at not more than the present figures. Since the development of reserves is still continuing at a faster rate than their depletion, the trend of individual well allowables will be definitely downward. To avoid inequities and inconsistencies and to maintain more reasonable ratios between the marginal, intermediate and top wells a gradual adjustment of all the factors of the flexible three phase allocation formula for the distribution of the state quota will probably be made by the Central Committee. The maintenance of the state allowable at a fairly constant amount is necessary for the gradual adjustment of allowables, as experience has demonstrated that notable fluctuations in individual well allowables lead to disruption and upheaval within the industry".

El Rey Wildcat Awaits Casing

El Rey Oil Co.'s wildcat well at the northwest corner of Western Ave. and Imperial Highway is standing idle with bottom at 9063 ft. awaiting installation of casing for a production test. The several operators who assisted financially in the drilling of the hole are now a bit backward about coming forward with the funds necessary to test the hard, tight, oil sand streaks cored from 8600 ft. to 9000 ft.

Newhall Well Is Strictly "No Dope"

Strictly "no dope" is British-American Oil Producing Co.'s policy on Edwina No. 1, the former Tamas Oil Co. well in sec. 11,3-16 near Newhall. Drilling is being carried on at an estimated depth of 4600 ft. but the results of several attempted formation tests remain unknown.

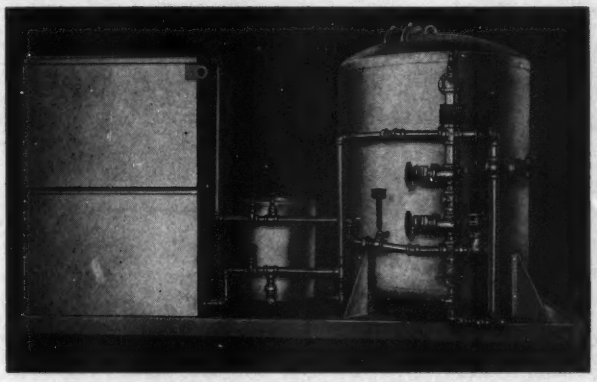
Consolidated Petroleum Co. is swabbing Needham No. 4 which is bottomed in Eocene at 4400 ft. in sec. 13,3-16. Oil enters the hole at a slow rate.

Tucker Drilling At Buena Park

Harrison M. Tucker is drilling Heath No. 1 below 1100 ft. in sec. 34,3-11 west of Buena Park. Surface casing was reported set at 1075 ft.

SOFT Water-

★ ELIMINATES BOILER COMPOUNDS



Typical Refinite Water Softener installation showing exclusive "salt saver" regeneration unit at left. Complete unit moved easily on skids. Write for details of present successful oil field installations.

Avoid Costly Drilling Delays

Hard water is the "bugaboo" of California oil fields. It clogs boiler feed systems with scale, causes frequent boiler repairs and long drilling delays. Smart drilling contractors rely on REFINITE Water Softening equipment to solve these problems. REFINITE natural zeolite softens the hardest water—eliminates the need for boiler compounds, reduces repairs and refluing to a minimum. Patented REFINITE salt saver system recovers 35% of the salt used for regenerating the zeolite. And the cost? REFINITE equipment often saves its entire initial cost on a single drilling operation! Write for FREE water analysis and FREE DEMONSTRATION.

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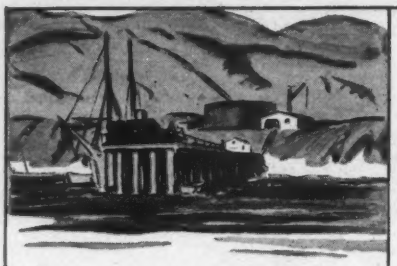
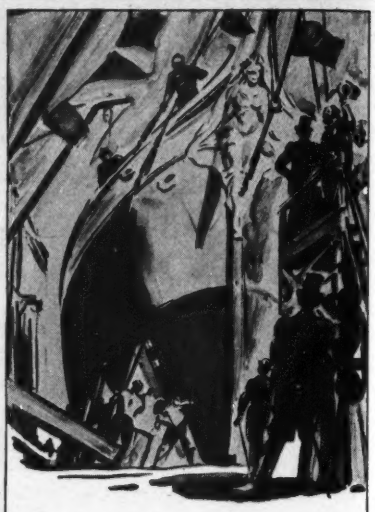
50 EXCITING YEARS

OF SERVICE TO THE WEST ★ 1890 ★ 1940



1. 1886...**Lyman Stewart** and W. L. Hardison discover oil near Santa Paula. Solve transportation problem by building *first Western pipeline to tidewater.*

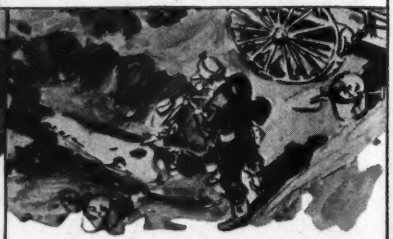
2. 1887...**Bad luck**...Four dry wells take all their capital. Los Angeles banker arranges one more loan. They sink it all in one well which *comes in!*



3. 1888...**With finances assured,** they turn to other innovations. *Build the first oil tanker on the Pacific Coast.*

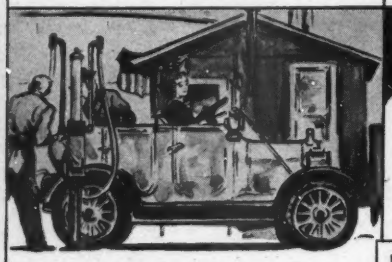
4. 1890...**Hardison and Stewart** merge with three other companies—form UNION OIL COMPANY of CALIFORNIA.

5. 1894...**Union Oil men** *develop first successful oil-burning locomotive in U.S.* — expanding petroleum market.



6. 1898...**Union Oil Company** sets up *first geological department in U.S.* Men discover many great oil fields, recover first fossils from La Brea Pits.

7. 1910...**Company drilling crew** brings in Lakeview No. 1 near Bakersfield—*greatest gusher ever drilled in U.S.*



8. 1913...**Anticipating automobile era**—Company opens one of the first service stations in the West.

9. 1922...**Union's Independence** threatened! Eastern combine buying up stock. Loyal stockholders save situation by uniting holdings.

10. 1932...**Company engineers** startle industry with 76—*the pioneer, non-premium, anti-knock gasoline in the West.*

11. 1934...**Propane-Solvent process** for refining Triton Motor Oil discovered. Produces *a 100% pure paraffin base oil with low carbon-forming qualities.*

12. 1940...**Union Oil Company** celebrates its 50th year of service to the West... still independent, still owned and operated *by* Westerners *for* Westerners. Look for Union's big orange and blue 76 sign.

UNION OIL COMPANY

1890. INDEPENDENT—1940. STILL INDEPENDENT

Views and News Around the Derricks

Mendota, Rio Bravo and Aliso Canyon

Superior Using Super-Super Rig

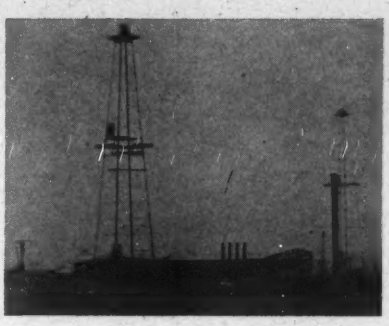
Bill Keck, head of The Superior Oil Co., and long time believer in extra large drilling equipment and an abundance of available steam power, topped his own record with the importation of the colossal draw-works in use on Weber No. 2 at Rio Bravo.

Famed for his super rig and 500 lb. working pressure boilers, with which he has set many deep Valley drilling records, a unit still adequately holding its own in current Rio Bravo drilling, Keck is now using the largest draw-works ever built.

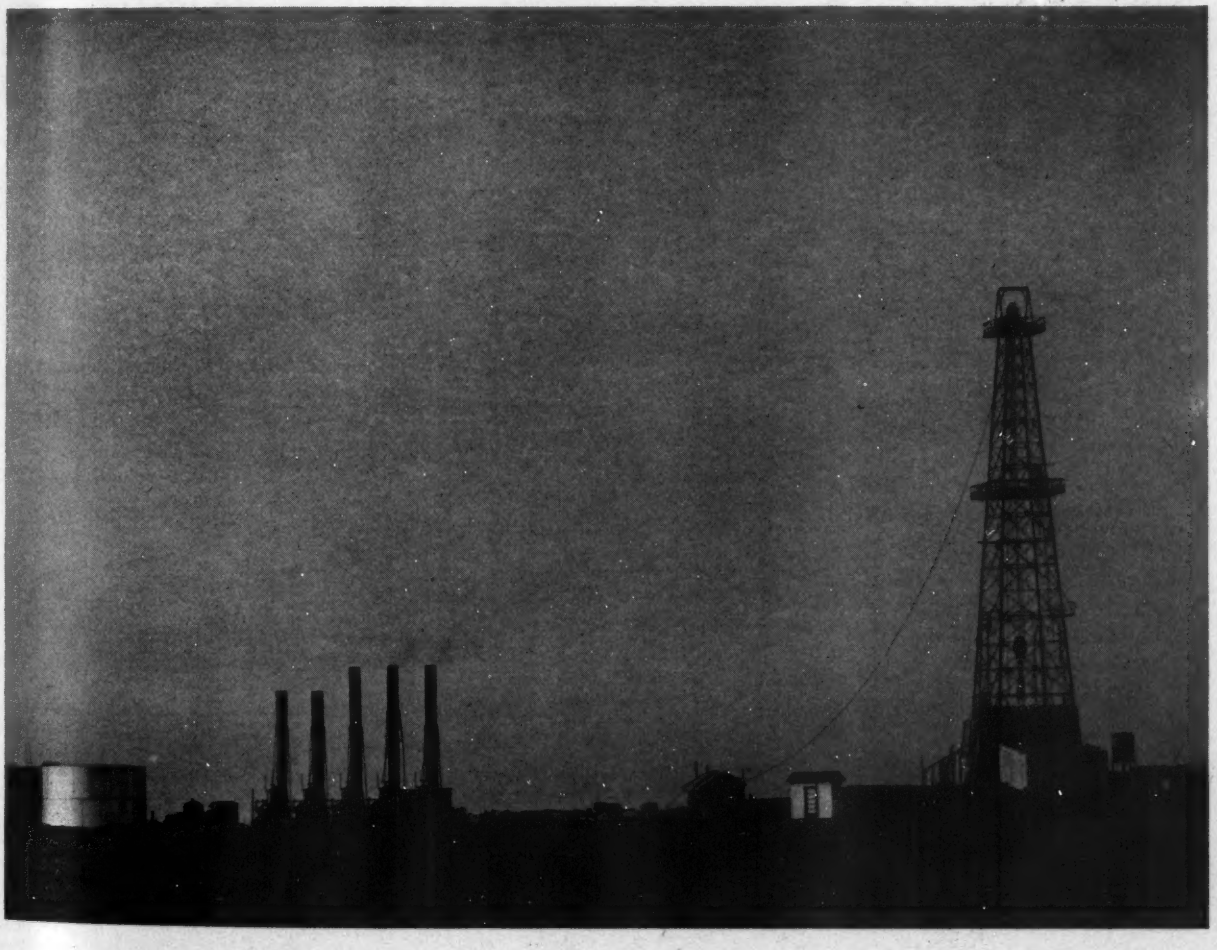
Pictured is this "COLOSSUS OF KECK," and a glance will suffice to convince you that this piece of equipment will literally set the genuine "old-timers" busy wagging their heads and tongues in generous comment that "this ain't the way she used to be done." Specifications for draw-works and standby are:

No. 33-62-FE Draw-Works

Ideal No. 33-62-FE Fully Enclosed All Roller Bearing 3-Shaft, 3-Speed Draw-Works—28′ Skid Type Unitized Frame, Air Operated Friction Clutch, High Speed Combination Low and Second Speed Drive through Multiple Jaw Clutch having Gear Tooth Spline Drive to Drum. The two Drum drives equipped with 3⅛ Quadruple Chain; the Compound Drive equipped with 3⅛ Double Chain; Engine Drive



Looking across the golf course from Manchester Ave. at Potrero. Steel derrick at left is Wilshire Annex No. 2; at right is Turf Oil Co.'s No. 1 on property of Hollywood Turf Club. In the background is the race track grandstand.



Jergins is going deeper in this erstwhile "mystery" in the Mendota Area.

Superior Oil Co.'s Weber No. 2, Sec. 27, 28-25, in Rio Bravo is the latest word in super-drilling rigs.

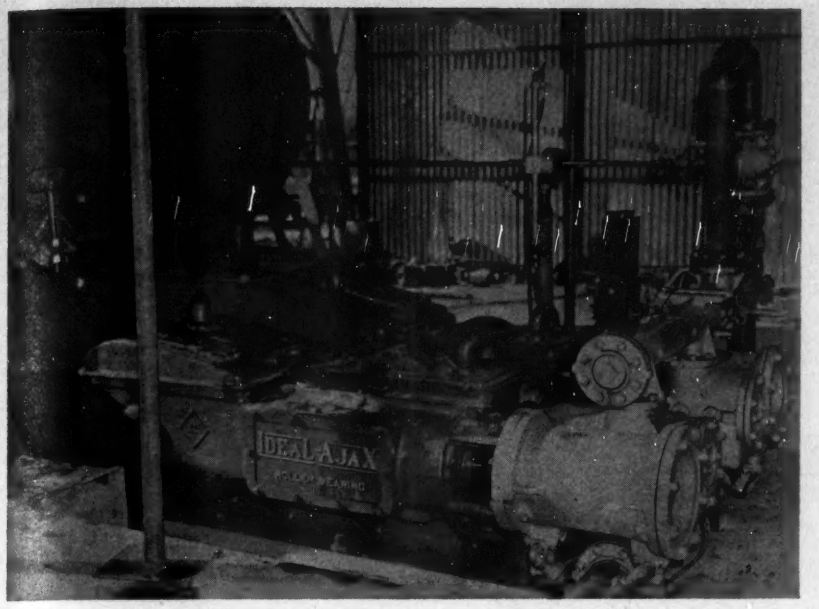
Sprocket for 3⅛ Double Chain; 32" diameter by 58" long Drum, grooved for 1¼" line; 62" x 10" Rolled Steel Water Cooled Brake Rims, and Type K-62 Compound Equalizing Brakes.

Cascade Lubrication System with all Drives in Oil Bath Housings; Pressure Control Water Regulator for Hydromatic Brake circulation; Diamond Tread Steel Flooring throughout; Provision for Independently Mounted Hydromatic Brake (includes Cradle); All Sprockets with Machine Cut Teeth having Hardened Driving Faces; Disengaging Gear Tooth Coupling Attachment to Hydromatic Brake; Foot Operated Controls for Foster Hi-Speed Cathead; Long RB Rope Roller on Driller's End and Short RB Rope Roller on Rotary End; Air Cooled Cast Steel Cathead on Driller's End (mounted on Hoist); Front Drum and Brake Rim Guard and Rear Shaft Guards; One Foster standard Hi-Speed Automatic Cathead (taper bore) assembled; One Foster Catline Hoist (taper bore) assembled; One 40" Double Rotor Parkersburg Hydromatic Brake.

Ideal Type "SD" rotary drive and standby unit with sand reel, SHS-20½ rotary machine and Ideal-Ajax 12x12 twin engine:

Includes long skid type frame to accommodate 12x12 Ideal-Ajax Piston Valve Type Twin Engine; Extension Shaft with 2 flexible couplings gear type to rotary machine—Extended shaft guard; Plain cathead on one end of line shaft; Extended type cathead on other end; No. 4 A.P.I. chain for standby drive; 3⅛ pitch double chain for engine drive; Oil bath enclosure for engine drive chain, and 26 teeth engine sprocket—3⅛ pitch double. Pneumatic power reverse unit as-

One of the crews on the Jergins Mendota Area "mystery." From left to right they are Al Freeman, E. A. Montgomery, H. Lorshbaugh, E. F. Flint, and Jack Rex.



The half-sunk mounting of the standby power on Superior's super rig is quite an idea, from all appearances.

sembled on engine; Pneumatic reverse control at both positions; Hydraulic steam control—From driller's position; Standby and sand reel drive; SHS-20½-SD rotary machine with 14 teeth No. 3 MC A.P.I. sprocket; Steam for engine—350 lbs.; Size of drum—standby—3500′ of 1¼″ line, and Size of drum—sand reel—15,000′ of 9/16″ line.

Mr. Keck is heading an organization that is universally recognized as something special in the line of "well diggers." The neatness with which the lease is maintained, the immaculate "housekeeping" on the derrick floor and the obvious pride of every worker in his organization, are evidence of the general efficiency which makes such consistent "fast hole" possible.

Sharing operating honors with Union Oil Co. in this rich, rapidly developing field, Superior is currently drilling Smith No. 3 in Rio Bravo oil sand at 11,425 ft., Fink No. 3 at 10,439 ft., Webber No. 2 at 8835 ft. and has poured foundation for Burner No. 3 and Smith No. 2.

Union Oil Co., participating in the activity which embraces sections 27 and 34,28-25, is at present drilling Kernco No. 32-34 at 10,202 ft., No. 54-34 at only 2330 ft., and is building rig for Kernco No. 45-34.

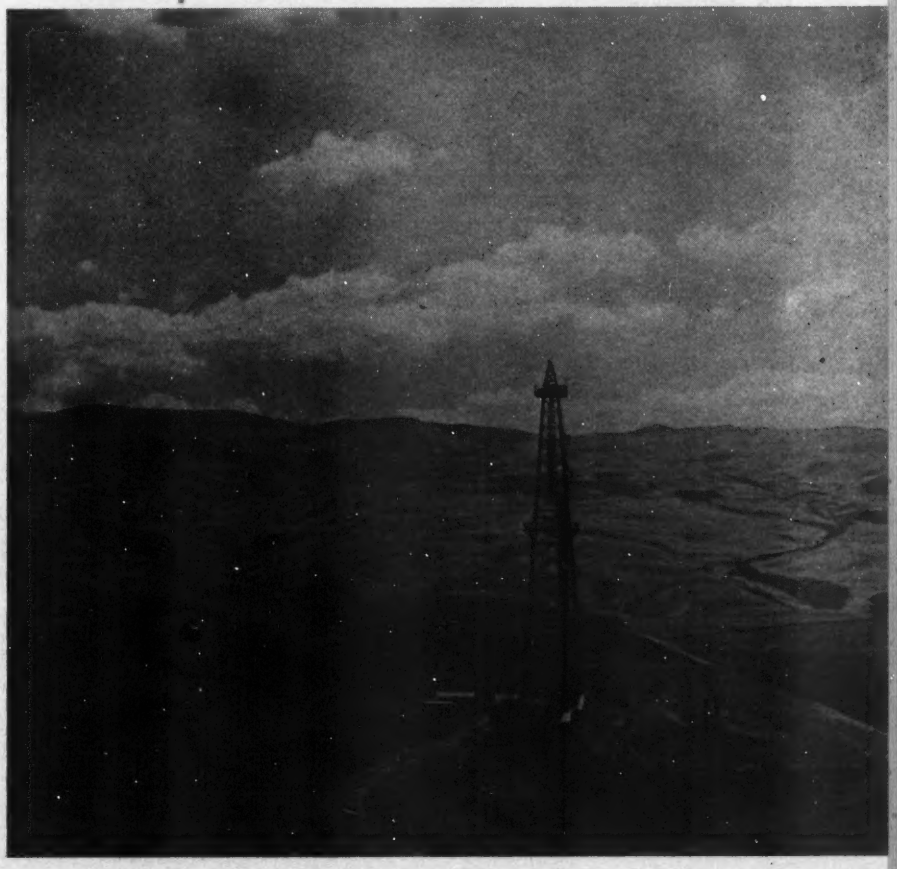
Most recent completion in the field was Union's Kernco No. 56-27, at the northeast flank of the field, flowing at more than a thousand barrel rate of clean 38 gravity oil through an 18/64 in. bean.

Richfield Prepares Wheeler Ridge Try

Rigging up to take another shot at the baffling showings encountered in the original deep test on top the Ridge, Richfield Oil Corp. soon will be drilling Wheeler Ridge-KCL No. 2 in sec. 28,11-20. Located near the south quarter corner of the section, the north half of which is productive at shallow levels, the current effort is hoped to be sufficiently higher on the deep structure to avoid the water which proved troublesome in No. 1.

Meanwhile Richfield is drilling Tejon Ranch No. 1 below 3000 ft. on sec. 2,10-19, of the Grapevine plains. Hoping to thoroughly prospect the Vedder, which was the ob-

Richfield is trying again in Wheeler Ridge, where water ruined a highly encouraging prospect, below, drilled better than 11,000 feet.



jective of the deep hole which The Petrol Corp. lost last fall, the well is the lone worker on the extreme south Valley plain.

New Aliso Canyon Horizon Yields 200 Bbls. & 13,000 MCF

Proving itself to be the most important Los Angeles county discovery since the bringing in of Wilmington in December, 1936, Tide Water Associated Oil Co.'s Aliso Canyon deep zone discovery well, Porter No. 12, came in flowing 200 bbls. of 53.5 gravity oil and 13,000,000 cu. ft. of wet gas. Controlled through a 32/64 in. bean, flow pressure was 1875 lbs. and casing head pressure 2320 lbs.

It is believed that only the upper section of the horizon is producing, as performance of the well with the entire 640 ft. interval open to the plug at 7551 ft., is almost identical with the rates registered during preliminary trials several weeks ago when only five feet was cleaned out below the shoe of the 4¼ in. water string at 6910 ft. Lending support to the conjecture are unofficial reports that sands near the top of the section were grayish while cuts became progressively darker with depth. Similar situations in the San Joaquin Valley have been successfully

handled by cementing off the upper gas sands and opening only the oil producing zones. Due to the small diameter of the hole in Porter No. 12, such procedure at this time would entail an expensive redrill job and will probably not be undertaken.

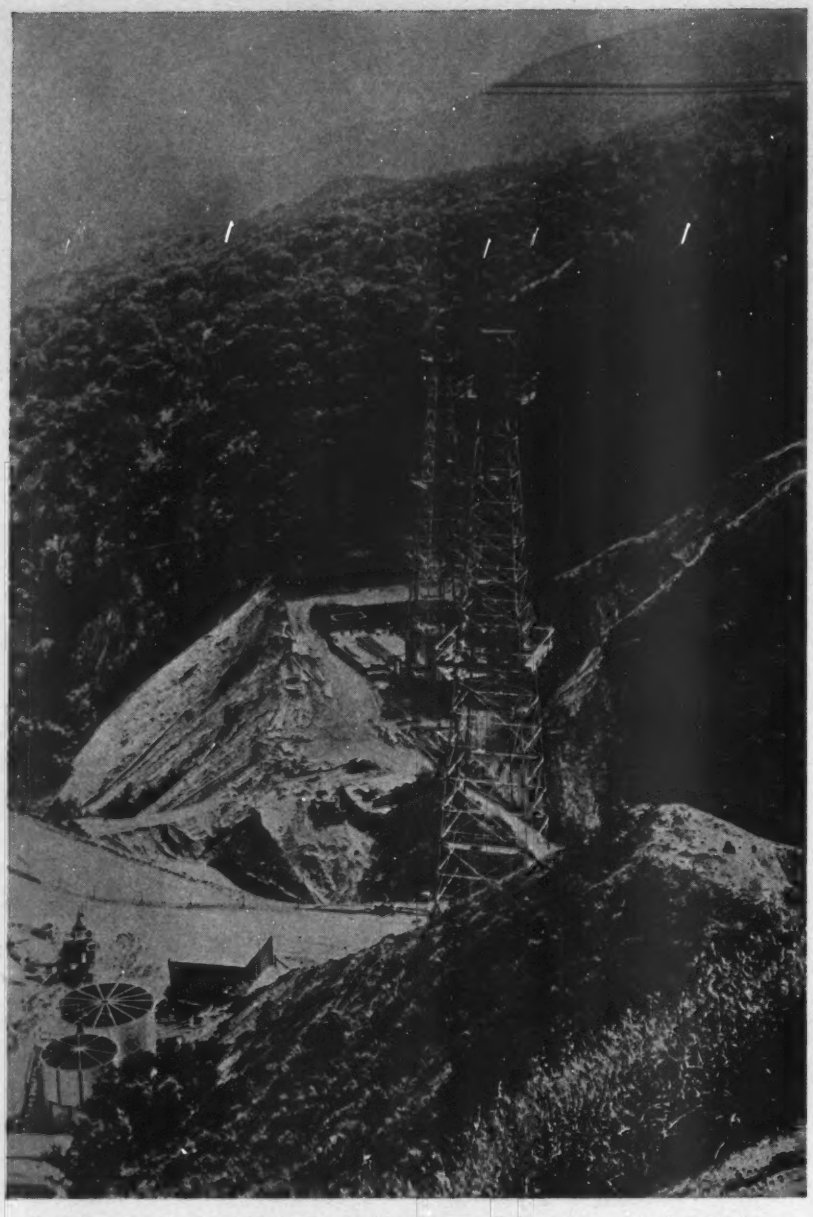
Because of extremely hard, steep-dipping formations and faulting, nearly eight months were required to drill Porter No. 12, it having been spudded August 23, 1939 and completed April 3, 1940. Hole was carried to 8202 ft. but was plugged to 7551 ft., the base of the oil horizon.

Beyond stating that the age of the new horizon is probably Miocene, Tide Water Associated officials refuse to comment.

After pressures in excess of 3000 lbs. were registered during the first test, a wholly new Christmas Tree was designed and built using only fittings capable of withstanding pressures of 10,000 lbs.

Jergins Prepares To Deepen "Cat"

Cheney Ranch No. 1, erstwhile "mystery hole" of the Jergins Oil Co., proved disappointing on tests of a reported gas zone from 6700 to 7140 ft. With the formation tester open 6 hours, a fair blow was noted and 30 stands of light, gassy



It is almost as bad to fall off the derrick floor as off the water table in Tidewater Associated's Aliso Canyon diggings.

mud recovered. Later tubing was run to 6655 ft. and after pulling half a score of swabs the sand line parted. While pulling the tubing it is reported the well showed some gas. Preparations are believed under way to deepen the hole from present bottom at 7581 ft.

Located in sec. 29,14-13, northwest of Coalinga, in what is called the Mendota Area, the well has been an object of interest to all California oil men.

Mono Finds New Montebello Zone

Definitely proving the presence of what might be called an "8-3" zone at Montebello, Mono Oil Co. deepened Foreman No. 1 to 7710 ft. where, on formation test, it flowed 600 bbls. of 35 gravity clean oil and 750,000 cu. ft. of gas. After three days, the oil yield dropped to 400 bbls. and the gas increased to 1,250,000 cu. ft., indicating that to successfully produce the lower sand it will be necessary to pack off the gas zone, which in this case was open, the tester being set in the 8⅝ in. casing at 7360 ft. Determined to try the sand interval found wet in Columbia Oil Co.'s Crawford No. 19 at 7900 ft., the project is now being deepened.

Located higher structurally than the Columbia well, Mono Oil Co. plans to bottom about 7850 ft. for the next test.

What will probably be the most

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ECONOMICAL
RELIABLE...

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Spiral Welded Pipe

The photograph shows a 12" Calco Pipe operating as a gas gathering line in the Ventura Oil Fields.

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conclusive test of all will soon be made by Montebello Reservoir Oil Co., which is rigging up to deepen No. 2 on the reservoir site at the southwest corner of Maple Ave. and Lincoln Blvd. This well is located on the crest of the structure.

Both previously reported deep wells have encountered difficulty and are trying to shut off water. R. R. Bush Oil Co.'s Mihlfred No. 2, plugged back from 8450 ft. to 7680 ft. found water entering the hole both at the top of the plug and at the casing shoe at 7445 ft. Columbia Oil Co. Crawford No. 19 plugged from 8155 ft. to 7950 ft. where a liner was cemented and gun-perforated below 7800 ft. and found wet.

L. A. Section A. S. M. E. Meets in Los Angeles

Prof. King Hathaway, of Stanford University and widely known consulting engineer of San Francisco, will speak on "Scientific Management, Present and Future, and Industrial Organization," when the Los Angeles section of the American Society of Mechanical Engineers meets April 11, in Los Angeles. The meeting opens at 6:30 p.m. in the Barker Bros. Building.

The date is that of the 60th Anniversary of the National Society and the 25th of the Los Angeles Section. The standing of the Los Angeles Section is fifth in the United States, having an active membership of 486. J. Roy Hoffman is chairman of the Section.

Pacific Coast Gas Men In Technical Conference

The Spring Technical Conference of the Pacific Coast Gas Association will be held in the Embassy Auditorium, 839 S. Grand Ave., Los Angeles, April 11-12.

Among an imposing array of speakers are leaders in every branch of natural gas and natural gasoline progress. The papers cover Production, Transmission, Distribution and Utilization.

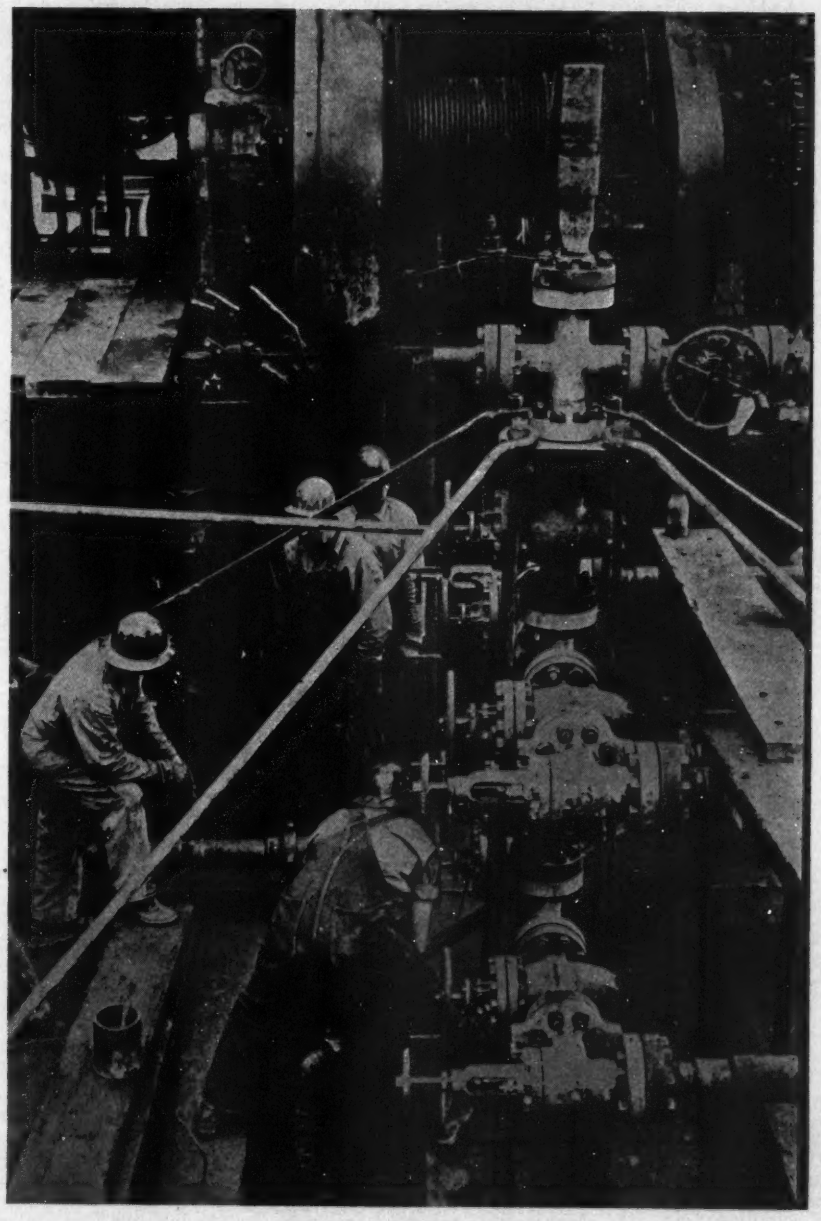
New C. N. G. A. Bulletin On Specific Gravity of Gases

Following more than two years of intensive study, conference and committee work, the California Natural Gasoline Association announces publication of its new bulletin, TS-391, titled, "Tentative Standard Methods for Determining the Specific Gravity of Gases." The announcement was jointly released by W. W. Robinson, Jr., of The Texas Company, who is general chairman of the group's Technical Committee and W. L. Cowan of the Union Oil Company, who is the chairman of the sub-committee in charge of drafting the new bulletin.

According to Sub-committee Chairman Cowan, it is well-known that the proper determination of specific gravity is of utmost importance in the derivation of correct coefficients for orifice meters and the industry has long needed a reliable presentation of the different methods by which this test may be made. In preparing the bulletin the California Natural Gasoline Association has spared no expense and the committee has spared no time and effort in bringing together, under a single cover, one of the most complete, exhaustive and accurate statements of specific gravity tests ever to be published, the announcement states.

In content, the bulletin discusses the limits of application, apparatus, sampling, field and laboratory test procedures and the calculation of results. The various specific gravity methods discussed are (1) Edward's balance; (2) the Ac-Me suspension balance: (3) Anubis balance;

(Continued on Page 27)



Here is a real high pressure job. Putting the finishing touches on the Christmas tree on Tidewater Associated's Porter No. 12 in Aliso Canyon.

LAUGH THIS OFF

Oil workers seem also to fall under the spell of the prevailing Quiz epidemic. One lad writes in to inquire what becomes of all the dirt that is displaced by new pipe lines. Son, that's easy. It's all grabbed up immediately by the spinach manufacturers.

And to the question, "Are oil men bibulous?" we would say offhand that some of them go to church and some don't.

Now, changing the subject a trifle, **Dick Hoover** claims to have heard this little sketch in a Bakersfield cafe the other morning. Says one rousty to the waitress, "Gimme a coupla hard boiled eggs." Says the other, "The same for me and be sure they're fresh." Yells the girl to the kitchen, "Four boiled eggs—two fresh!"

Then there was **Clayton Hall's** story of the pumper's daughter and Father Time. "What I want," the girl told the clerk in the hardware store, "is an alarm clock that will wake up Pa without disturbing the rest of the family." "Sorry," sympathized the clerk, "we just have the old fashioned kind that wakes the whole family without disturbing Pa."

BAKER "BAKWIK"
DRILL PIPE FLOATS

Pay their own way by:

1 Minimizing Plugged Bits

2 Relieving Strain on Derrick, Rig Equipment and Wire Lines

3 Eliminating Wet Strings

4 Providing Positive Back-Pressure Valve

5 Preventing Blow-outs

6 Minimizing —Often Preventing Entirely—Irreparable Damage Should Drilling String Part

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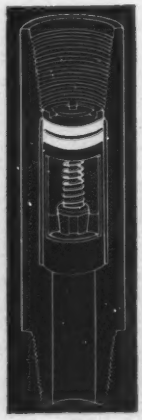

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And, by the way, did we ever tell you about the poor night watchman who carried his clock so long he became punch drunk?

George Sproul, speaking of a bimbo who has never shown any great liking for work, says, "He went out to play golf last Saturday, and so far as I know that's the first time he ever made any attempt to hit the ball."

Dave Caldwell next tells about the son of an eastern oil magnate who is working out here in the laboratory of a local company. A few days ago the kid wrote a letter home to his dad, couched in the following pleading terms, "Dear Pop: Please send me the Journal of the American Chemical Society, also fifty dollars. Bill. P.S. Don't forget the Journal."

Dave adds the interesting information that you can always tell a surveyor by his map.

Harvey Lee also brings some encouraging news, "Because of recent heavy rains," sezze, "there will be no dry holes drilled for some time."

Harvey being the poppa of twins has developed some very interesting information on the subject. For instance, when an ordinary singleton child makes up its mind to exercise its lungs, something has to be done about it, but with twins each one cries so hard you can't hear the other.

Proving beyond doubt that troubles never come singly.

At which point **Bill Herrod** remarks, "I like the old songs, the real old ones that nobody sings any more."

And isn't it amazing that the most untidy people insist on having their whiskey neat?

A couple of oil men were on their way home in the wee sma' hours. Arm in arm they were and singing lustily, when suddenly the one on the inside smacked his head solidly against a protruding barber pole. It knocked him out colder than 40 below, but eventually he came right back to sub normal, and feeling the bump on his forehead tenderly, he said, "Gee, that dame with the red white and blue stockings on could kick higher than any woman I've ever seen."

Whereupon, **Percy Lea** discloses a most unusual case. It seems that a local lady called up the plumber in great distress, and told him a hot water pipe had burst in her home. "Is it leaking pretty badly?" asked the craftsman. "Oh, it's terrible," she moaned. "Well," said the plumber reassuringly, "just hold your hand over it while I look in my book and see what day I can come."

With which we end another fruitless session. Don't forget that the best way to save money is to get sleepy right after dinner.

Field Development

San Joaquin Valley

Tide Water Well Creates Surprise

Regarded merely as a validation hole on a small portion of its United States lease acreage, Tide Water Associated Oil Co., and everyone else familiar with shallow East Coalinga field drilling, was amazed when Guardian No. 22 started flowing at a 1400 barrel rate.

Located in the northeast quarter of sec. 2,20-15, the well had been drilled to 3612 ft. after finding the top of the Temblor oil sands at 3266 ft. With liner, tubing and rods run, the well was placed on the pump at midnight with the expectation of getting only the small production which is normal in the area. Half an hour following, the well began to flow clean, 32.2 gravity oil at the aforementioned rate. The well is now flowing 887 barrels of 31 gravity clean oil with 400,000 cubic feet of gas.

Offset on all sides by leases of other large operators, the unusual flow will probably not occasion more than a casual flurry of shallow drilling.

Shell Finds Cole's Levee Field Limits

Abandoned at 10,447 ft., near the northeast corner of sec. 17,31-25, Shell Oil Co.'s KCL No. B-81-17 topped the barren Stevens sand at 10,325 ft. Located a half mile southwest of Standard Oil Co.'s high gravity production in section 20, the project has definitely established the southwesterly limits of the field.

The southeasterly reach has also been clearly delineated by the showings of two Tide Water Associated Oil Co. wells. KCL No. 72, near the company's meagerly productive No. 81 in sec. 14,31-25, is being abandoned after finding only streaks of oil sand near the top of the gray Stevens sand. A mile farther southeast Tide Water recently abandoned KCL No. 65, near the center of section 13, after drilling to 11,050 ft. Sole findings were thin streaks of oil sand near the top of the zone which were considered undeserving of tests.

These findings seem to indicate that the entire southerly flank of Cole's Levee is conclusively defined, and that activity

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SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
	Fresno County				
Cantua Creek	Logan, J. E., L & Y	1	26, 16-14		Rig
	The Texas Co., S.P.	1	23, 17-15	9763	Drilling
Coalinga	Lewis, C. H.	1	18, 21-15	800	Prep. to resume
	Section Thirty Oil Co.	7	30, 19-15		Rig cable tools
	Tide Water Assoc. Oil, Guardian	22	2, 20-15	3612	Flowing
Gatos Creek	Gatos Creek Oil Co.	1	19, 19-13	466	Idle
Huron	The Texas Co., Boston	1	14, 20-18	10559	Drilling
Kingsburg	Erickson & Swanson	2	22, 16-22		Rigging portable
Mendota	Jergins Oil Co., Cheney Ranch	1	29, 14-13	7581	Cleaning out
	Kern County				
Arvin	Morton, Lindley C., Jewett	1	23, 31-29	4240	Drilling
Belridge—South	Santa Mora Oil Co.	1	10, 28-20		Material
	Union Oil Co., Fitzgerald-Weston	1	13, 29-21	6060	Drilling
Buena Vista	Gen. Pet. Corp., B.V.A.	1	1, 32-24	11886	Idle
	Shell Oil Co., B.V.A.	45-9	9, 32-25	11376	Drilling
Comanche Point	Oil Scout, Inc.	1	27, 32-29	5508	Idle
Devil's Den	Trigg, H. C.	1	11, 25-18	492	Stdg. cem.
Edison	Goodrum & Vincent, Inc., S.P.	3	31, 29-30	803	Pulling casing
	Goodrum & Vincent, Inc., S.P.	4	31, 29-30	421	Bailing
Grapevine	Richfield Oil Corp., Tejon Ranch	1	2, 10-19	2991	Drilling
Jasmine	Premier Extension Oil Co.	1	33, 25-27	1589	Drilling
Kern Front	Davis Petroleum Co.	1	13, 28-27	1804	Idle
McKittrick	Burt & Taylor, Taylor	1	30, 30-22	1047	Idle
	Cal Crude Pet. Co.	5	34, 30-22	1195	Drilling
	Franco-Western Oil Co.	18	8, 30-22	2086	Rng. csg.
Mt. Poso	Hearte & Harkness	1	36, 26-27	3203	Drilling
Round Mt.	Shell Oil Co., Brandt	1	33, 28-29	2190	Drilling
San Emigdio	Shell Oil Co. KCL 2A	52-13	13, 11-22	13873	Abandoned
Semitropic	Gen. Pet. Corp., K.P.C.	1	16, 26-22		Foundation
	North Kern Oil Co., Sawyer	1	16, 25-22		Rig
Shafter	Continental Oil Co., Comm.	1	12, 28-24	12679	Drilling
Shale Hills	Scotia Exploration Co., Abbott	1	7, 27-19	2047	Idle
	The Texas Co., McD-Theta	1	12, 28-19	3395	Redrilling
Wheeler Ridge	Richfield Oil Corp. KCL 2		28, 11-20		Rigging up
	Kings County				
Kettleman—South Dome	Bristol Oil Co., Smith	1	35, 24-19	8054	Stdg. cem.
Reef Ridge	Chuka Oil Co.	2A	10, 23-16	185	Idle
So. Tulare Lake	Dudley, Ben	1	11, 24-20	2600	Idle
W. Tulare Lake	Shell Oil Co., Cohn Estate	6-4	4, 22-19	11192	Drilling
	Tulare County				
Alpaugh	R.W.B. Gas & Oil Co.	1	11, 24-23	2675	Abandoned

in this section of the field will be confined to drilling up acreage which has been proved productive.

In the northerly section of the field, however, between the area designated as Richfield-Western and Cole's Levee proper, development is consistently bringing the production closer together.

Latest to complete is Richfield Oil Corp.'s KCL-B No. 72-33, located near the northeast corner of sec. 33,30-25. Initial production was 1500 barrels per day of 32 gravity oil through a 96/64 in. bean along with 1,000,000 cubic feet of gas, from 9390 ft.

Greeley Extension Area Ultra Active

With a 3000 barrel completion just effected, three active drillers and three projects in phases of preparation, the north Greeley area merits attention.

Fifth well to be completed from the Vedder zone, recently found productive here by the General Petroleum Corp., is Standard Oil Co.'s KCL No. 12-7, near the west quarter corner of the southwest quarter of sec. 7,29-26. Bottomed at 11,510 ft. the well was finished flowing 3005 barrels daily of 34.5 gravity clean oil along with 2,520,000 cubic feet of gas through a 29/64 in. bean. One location to the north Standard's No. 12-8 is drilling below 10,085 ft., while slightly to the northeast, site has been graded for No. 12-9.

General Petroleum Corp.'s Oughton No. 1 is below 9150 ft. while its Sullivan No. 2, on the discovery lease in sec. 12, 29-25, is drilling at 8800 ft. General Petroleum has also started work on Wallace No. 1, to be drilled near the south quarter corner of sec. 1,29-25.

Superior Oil Co. has spudded in its second Greeley well, Merrill No. 1. Located east of the Gen. Pet. Corp. well, the try is near the southeast corner of section 1.

Drilling between extension production and the main body of the original field limits, Standard Oil Co.'s KCL No. 11-23, near the north quarter corner of sec. 18, 29-26, is testing water shut off on 7 in. landed at 11,364 ft.

Logan Building Rig For Cantua Creek Try

With the drilling contract let to the Pettijohn Drilling Co., J. E. Logan is building rig for L&Y No. 1 in sec. 26, 16-14 of Fresno county. The play is intended to locate an oil accumulation in the Cantua Creek district, which has been the objective of many previous trys.

The Texas Co. is at present drilling S.P. No. 1, in sec. 23,17-15 of the district, with like holes. Last reports place the well near 9800 ft. after marking the Eocene at approximately 8775 ft. Interest in the area has been maintained because of the many sand bodies present and because of the fact that some high gravity oil was obtained in earlier drilling operations by Western Gulf Oil Co.

K.N.D.A. Starts Deep Out-Post

Moving to a location near the northwest corner of sec. 18,21-17, Kettleman North Dome Association is starting work on well No. 322-18J. Located a quarter of a mile north of the nearest production, the well is an attempt to find production in the McAdams sand, a section of the Eocene sometimes known as the Avenal sandstone. Latest of the nearby wells to encounter the zone was 334-18J, which topped the deep sands at 10,700 ft., near the south quarter corner of the section.

The field, held almost exclusively by the Association and Standard Oil Co., is active from tip to tip, with K.N.D.A. running 5 strings and preparing sites for seven more, and Standard working ten outfits while preparing for the eleventh.

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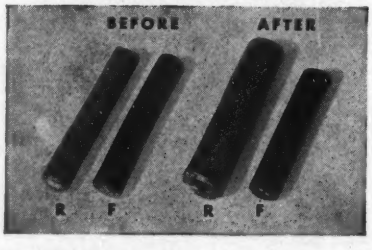

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NOTE the size of the two samples of wire at the left—R, rubber; F, Flamenol. The two samples at the right were also of the same size before being submerged in oil for six months. Note how rubber has swelled. Flamenol has not changed.
You can easily make this test yourself. We'll gladly furnish samples.
Flamenol wire is approved by the Underwriters' Laboratories, Inc., for use in oily locations. Bulletin GEA-2733C gives latest details. For a copy—as well as for samples—address the nearest G-E sales office, or General Electric Company, Dept., 6—201, Schenectady, New York.

GENERAL ELECTRIC

Union Oil Co. is drilling its Ameranda-King No. 9 below 7500 ft. near the center of the southwest quarter of sec. 29, 21-17.

Latest completion in the field was chalked up by Standard who finished well No. 63-35Q, near the center of sec. 35,22-18, at the southeasterly tip of the field, from the upper sands flowing 250 bbls. of 35 gravity oil.

Huron Area "Cat" Coring Gray Sand

The Texas Co.'s Boston No. 1, pioneer deep test of the area centered in sec. 14, 20-18, at the Fresno-Kings county line, is coring gray sand at 10,560 ft. Nothing of especial significance has been reported concerning this well, and its exact position in the geologic column is yet undetermined.

Jasmine Area Test Drilling

Operating in the intermittently drilled Jasmine area of the east Valley district, Premier Extension Oil Co. is drilling well No. 1 at 1587 ft. for a test of sec. 33, 25-27. The current driller is about 4 miles southwest of the old Doyle Pet. Corp. Quinn No. 1 which yielded some 10 gravity oil, along with copious amounts of water, from 2880 ft., when it was cleaned out and tested by the Dilamar Oil Corp. in 1938.

Fruitvale Deep Try Headed for Basement

Apparently determined to exhaust all possibilities of deeper Fruitvale production, Western Gulf Oil Co. is carrying its deep try, KCL No. B-45, well on the way to the suspected basement. Last reported at 9385 ft., the well had reported oil showings at 4425 ft. with the barren Vedder found at 8980 ft. Located in sec. 22,29-27 the well is in almost the exact center of this field in which Western Gulf is the largest operator.

Alpaugh Area Gas Test Abandoned

Stepping out 4 miles north of the Trico gas field and drilling to the Mya gas zones, R.W.B. Gas & Oil Co. proved that commercial gas at shallow levels is not possible in section 11,24-23. Bottomed at 2675 ft. in gray sand and shale, the first Mya zone was found at 2605 ft. Formation tests from 2635 ft. to bottom yielded only mud showing a little gas. Apparently feeling that the test was conclusive, the project was officially abandoned.

In the main body of the Trico gas field, Standard Oil Co. completed Tulare Farms No. 1-2 flowing 10,150,000 cubic feet of gas through a 48/64 in. casing bean. Located in sec. 34,24-23, the well is flowing from two thin sand bodies near 2435 and 2472 ft.

Tracy Development Corp. Assumes Valuable Property

Purchase of the leases, refinery and goodwill of the Lake View Oil & Refining Co. is announced by the Tracy Development Corp. Located at the edge of Maricopa, in Kern county, the refinery is at present processing crude from nine company-owned wells and treating oil from adjacent lease operators. Situated on a lease which produces a portion of its oil needs, the plant is to be thoroughly reconditioned. A strong possibility that the petroleum resources will be explored at greater depths than any previous drilling is also indicated by the new owners.

Oil Scouts, Inc. Standing Idle

Idle at 5505 ft. in grayish green sand, thought to be near the base of Chanac formations, Oil Scout, Inc.'s Tejon Minerals No. 1 is the subject of debate by concerned interests. Located on the plains south of Arvin, in sec. 27,32-29 of the Comanche Point area, the well has encountered nothing of major importance to present depth. The question now is whether it is expedient to continue operations.

Shell Oil Completes Big Ten Section Well

Moving to the center of its privately controlled Ten Section field, Shell Oil Co. has completed a record producer in KCL No. A-72-30 near the northeast corner of sec. 30,30-26. Flowing from Stevens oil sands, open from 7940 to 8220 ft., the well made 3,078 bbls. of clean 34 gravity oil and 1,865,000 cu. ft. of gas on the initial gauge.

Shell has three other strings at work in this field and is laying groundwork for three other projects as fast as the tools are freed.

North Kern Oil Co. In Semi-Tropic Try

A wildcat play in the Semi-Tropic area has been started with the building of a rig in sec. 16,25-22 by the North Kern Oil Co. According to C. A. Doody, Los Angeles oil man, the company has been formed by a coalition of men who are well known in California oil circles. Organization plans call for a meeting to name the officers and executive personnel in the immediate future.

Immediate action is assured by the fact that the Taft Well Drilling Co. has been commissioned to install drilling equipment. Plans call for the well to be carried to the Eocene in the event that commercial gas or oil is not found at higher levels.

Added impetus is given the play by the fact that Richfield Oil Corp.'s Kerwin No. 1, 7 miles south of the current try, was reported to have produced some high gravity oil from 3600 ft. during operations in 1928.

Engaging in a similar play much nearer the old Richfield well, General Petroleum Corp. has poured foundation for K.P.C. No. 1 in sec. 16,26-22. Only a mile north of the old well, it is thought that with the improvement in drilling technique and formation analysis accomplished in the last decade, the new try may prove a commercial success in an area formerly considered unproductive.

Denny Bernt Joins Pacific Perforating Co.

M. G. "Curley" Brumbly recently announced the appointment of D. M. "Denny" Bernt, Jr. as chief engineer of the Pacific Perforating Co., Ltd., and the Torrance Cleaner Co.

Denny Bernt, Jr.

For the past eleven years Mr. Bernt was employed by George F. Getty, Inc. and Pacific Western Oil Corporation as petroleum engineer. For five and one-half years previous to that he was petroleum engineer for Tidewater-Associated Oil Co.

Los Angeles Basin

Dominguez Outpost Flows 1700 Bbl. Rate

Flowing at the rate of 1700 bbls. a day, R. E. Havenstrite, Operator, swabbed in Larronde No. 2 as the most southwesterly producer in the Dominguez field. Gravity of the oil was in excess of 30 and the water content was down to 5.0%.

Believed to be about 80 ft. lower on structure than Larronde No. 1, the well produces two intervals; from 7032 to 7230 ft. and from 7382 ft. to bottom at 7587 ft.

Continuing development of the property, the operator is rigging up to drill No. 3 one location west of No. 1.

At the southwest corner of Avalon Blvd. and Victoria Ave. Gibraltar Drilling Corp. is drilling below 2600 ft.

On the east side of Avalon Blvd., Union Oil Co. is nearing completion in Callender No. 76 and is preparing to drill No. 77. Offsetting Havenstrite's No. 1, Union is starting Austin No. 1 on the Gardena Syndicate lease.

Extension wells at both ends of the field went by the boards with the abandonment of Gus Pongratz Oil Co.'s Grant No. 1 near Main St. and Walnut Ave. and Morton & Elder's Stabler-Dominguez well at the southeast edge of production. The former well drilled to 7660 ft. finding only a few feet of oil sand in the Callender zones. The latter went to 7430 ft. without encountering production.

Shell Oil Co. completed Reyes No. 102 as a small producer.

Stanton Wildcat Drilling at 5700 Ft.

United Oil Co.'s Stanton area wildcat, Schimming No. 1, is drilling below 5700 ft. according to R. W. (Rocky) Jerman, president. Ditch showings have been reported at intervals but nothing worthy of a test has yet been encountered.

Using light gasoline driven equipment, Bird & Chambers drilled to 1250 ft. where drill pipe was stuck. The well is at the southeast corner of Magnolia and Lampson streets west of Garden Grove.

Two Tests Slated For E. Huntington

The old adage "It never rains but it pours", is often illustrated in the oil industry. At present the point is made by two wells on the flat east of the main Huntington Beach field where Desert Glow Oil Co., headed by J. C. Theriot, and Owens, Johnson & Baker, Texas operators, are proposing to try for new production within a stone's throw of each other.

The Desert Glow company is entering one of the old Standard Oil Co. Farnsworth wells, abandoned several years ago, with the intention of deepening to about 6500 ft. to encounter sands known to be productive on the Thompson property to the northwest.

The Owens, Johnson & Baker organization has taken over the M.C.A. Drilling Co. project, and under the guidance of geologist A. A. Carrey, will seek production first at relatively shallow levels.

Barnsdall Starts Eleventh Frisco Well

While completing No. 9, Barnsdall Oil Co. is starting its eleventh well on Rancho San Francisco property in the prolific Newhall-Potrero field. No dry holes have been drilled to date, and judging from present appearances, there will be none for some time, at least for Barnsdall.

Typical of the field is No. 9, which, bottomed at 7195 ft., will produce 750 ft. of Miocene formations which are reputed to run better than 30% oil sand. No well has yet been allowed to produce at maximum capacity, the highest rates registered being only about 2000 bbls. a day through small beans. Gas-oil ratios are quite favorable, being about 750 cu. ft. per barrel.

Deep Zone Feature of Long Beach Picture

Again the 10,000 ft. zone features the Long Beach field picture with Allied Petroleum Corp. preparing to core ahead in Well No. 34. Progress was delayed by a serious fishing job which resulted when drill pipe "froze" on bottom at 10,057 ft. Weeks were required in the long and tedious work of cutting and re-

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Athens	El Rey Oil Co., Westmore	1	2, 3-14	9063	Idle
	Melrose Pet. Co.	1	12, 3-14		Rig
Castaic	Lang, Ed. W., Rupy	1	7, 5-16	781	Drilling
	Pedro Pet. Co., Oates	1	24, 5-17	250	Idle
	Worland, C. C., Jenkins-Owens	1	18, 5-16	1950	Idle
Chatsworth	Fernando Oils, Ltd., Holmes	1	18, 2-16		Grade
Inglewood	Vanguard Oil Co., L.A.I.	1	29, 2-14	500	Drilling
Mint Canyon	Redwood Oil Co., Mitchell	2	22, 4-15	525	Idle
Newhall	British-American Oil Prod. Co., Edwina	1	14, 3-16	4541	Drilling
	Canyon Oil Co., Sanborn	1	6, 3-16		Rig
	Consolidated Pet. Co., Needham	4	13, 3-16	4398	Swabbing
	Hazard Oil Co.	1	1, 3-16	2306	Idle
	Klingman, H. B., Happy Valley	1	3, 3-16	20	Tech. Spud.-Idle
	Mangrum and Page, Lintz	1	4, 3-15	852	Idle
Palos Verdes	Rolling Hills Pet.	1	27, 4-14	6580	Testing WSO
Puente Hills	Kasanke, J. F., Graside	1	27, 2-10		Material
Sunland	Casa Grande Oil Co.,Lopez-Lundy	1	1, 2-15	2320	Idle
West Whittier	West Whittier Oil Co., Pellissier	1	17, 2-11	4400	Pumping no est.
	Orange County				
Buena Park	Tucker, H. M., Heath	1	34, 3-11	1160	Stdg. cem.
Costa Mesa	Thompson, Milton N., Banning	1	9, 6-10	5560	Idle
Garden Grove	Bird & Chambers	1	31, 4-10	1250	Drilling
Stanton	United Oil Co., Schimming	1	25, 4-11	5611	Drilling
	San Bernardino County				
Puente Hills	E. F. Stella, Trustee	1	5, 3-8	600	Rigging up to deepen

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Contra Costa	Tassajara Oil Corp.	1	9, 2s-1e	9727	Prep. to test
Monterey	Loma Grande Oil Co., Corey	1	23, 24s-10e		Rig
	Priest Valley Pet. Co., Greve	1	22, 20s-12e	2275	Drilling
Sacramento	Clay City Oil Corp.	1	25, 6n-7e		Location
	Amerada Pet. Corp., Carpenter	1	20, 4n-3e		Rig
	Superior Oil Co., Larsen	1	17, 3n-3e		Location
Solano	Richfield Oil Corp., Potrero Hills	2	5, 4n-1w	3670	Reaming
Sutter	Buttes Oilfields, Inc., McPherrin	6	1, 15n-1e	7650	Idle

moving the fish a few feet at a time, but the hole is now in good shape with everything out but the drill collar and casing cemented at 9730 ft.

Little difficulty is expected in sidetracking the small fish remaining and the six or seven hundred feet of hole to go should be made in short order. Where the well will be finally bottomed is undetermined but it is a certainty it will be carried below its 10,450 ft. neighbor, De Soto Oil Co. No. 1 which discovered the deep zone.

About twenty projects are active throughout the Long Beach-Signal Hill field with the majority trying for the 3600 ft. zone in the Pepper Drive sector. Completions vary from nearly all water to 100 bbls. or better, clean.

Union Oil Plans La Habra Wildcat

Union Oil Company is planning within the next thirty days to begin operations in La Habra Heights in connection with the exploration of its mineral rights.

Surf Associates, Termo Submit High Beach Bids

Surf Associates, Inc. and The Termo Co. appear to have the inside track for the six wells to be drilled under State owned tidelands at Huntington Beach, each concern having bid high on three.

According to Webb Shadle, executive officer of the Division of Lands of the State Department of Finance, Surf Associates, Inc.'s tender was tops for wells "G," "H" and "J" while The Termo Co.'s submission was the highest for wells "L", "N" and "P".

Federal Rigs Inglewood Test

With steel derrick already erected on the Smith property at the north end of Inglewood production, Federal Oil Co. is moving in equipment to drill its proposed Miocene test. The project adjoins the Plymouth well which several years ago found oil sands but, due to mechanical difficulties, was not completed.

George Duty Plans Five Points Well

George Duty, old time Long Beach operator, is planning immediate drilling in the Five Points area of Huntington Beach, and according to late advices, has started derrick foundations 500 ft. south of Island View Oil Co.'s 100 bbl. producer.

On a location adjoining Mr. Duty's, Clear View Oil Co. is finishing well No. 1 at 4387 ft. after cementing 7 in. casing at 4228 ft.

Richfield Well Pumps 125 Bbls.

Pumping at the rate of 125 bbls. a day, Great Northern Oil Co. completed its well near the center of the old Richfield field. Gravity of the oil is reported as better than 20 and cut is said to be 5.0%. Three hundred and fifty feet of oil sand is open from the shoe of the water string to bottom at 3450 ft.

Prospect Hole Spuds Near Nipton, Calif.

Unique in the history of California oil and mining industries is the prospect hole being spudded in near the desert station of Nipton on the Union Pacific line 35 miles south of Las Vegas, Nevada.

On U. S. government lands in sec. 34, 16n-15e, Geo. R. Houston and associates have installed a gasoline-driven rotary rig with the intention of drilling to about 2500 ft. Although the area is classed as highly mineralized, Mr. Houston claims to have seen oil produced from a nearby 600 ft. water well and that it is all the same to him whether his test well encounters gold, quicksilver or petroleum. He insists that it is a "Mystery Well" and we agree without question that it is.

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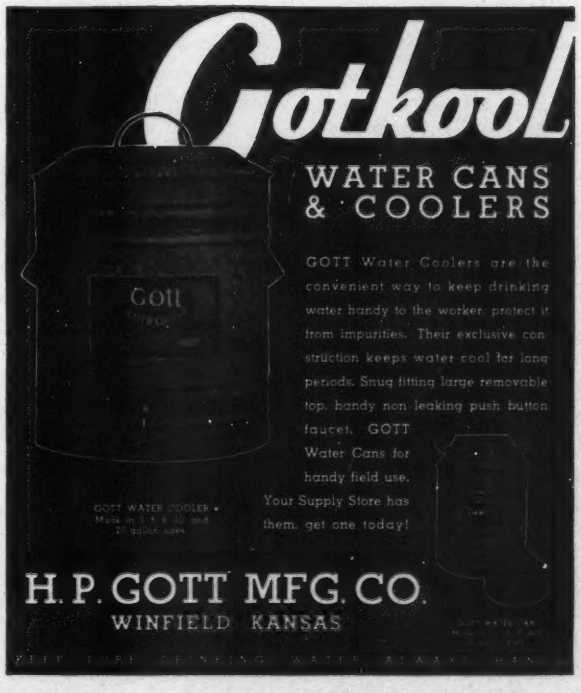
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WINFIELD KANSAS

Coastal District

Ohio Abandons Simi Wildcat

Finding nothing in the way of encouragement, Ohio Oil Co. abandoned its Simi area wildcat, Vail No. 1, at 5714 feet. Little data has been released by the operator on formation encountered, but it is reported that Eocene was encountered at 4000 ft. and that bottom was in very hard conglomerate. Location of the project was in sec. 10,2-19.

Independents Hold Ventura Ave. Interest

Since the advent of independent activity in the Avenue sector of Ventura Avenue, popular interest in the field as a whole has steadily increased.

Operating two strings of tools, California Alliance Oil Co. is now the busiest of the newcomers, while its running mate, British-American Oil Producing Co., is active in only one. Both projects of California Alliance are semi-exploratory wells, being northerly outposts on either side of the Avenue. Deepest is Hartman Ranch No. 2 which is coring below 9360 ft., while Schmidt No. 1 is drilling above 5000 ft.

British-American Oil Producing Co.'s Barnard No. 1, a near-offset to Hartman Ranch No. 1, is just getting underway again after setting surface casing at 1900 ft. The company recently reperforated Hartman No. 8 in the 8000 ft. horizons.

Shell Oil Co., Inc. and Tide Water Associated Oil Co. are operating about a dozen strings of tools between them, their latest completions being Shell's Taylor No. 113 for 1600 bbls. and T.W.A.'s V.L.&W. No. 43 for 2600 bbls.

In the northeasterly section, Ralph B. Lloyd spudded in well No. 5 and is preparing to set surface casing.

Santa Maria Outpost Flows 700 Bbls. a Day

Flowing initially 700 bbls. a day, Union Oil Co. brought in Le Roy No. 4 as a westerly outpost of the Santa Maria Valley field. With bottom at 5480 ft. and casing cemented at 5065 ft., a perforated liner was run and the well swabbed in producing 17 gravity clean oil. With bean reduced to 8/64 in., the yield was 135 bbls. under 410 lbs. flow pressure.

Fred E. Cole is spudding in his latest Santa Maria Valley well, Giacomini No. 1 in sec. 24,10-35.

Continental Gets 2100 Bbls. In San Miguelito Completion

Continental Oil Co. added a 2100 bbl. well to its list of fine producers at San Miguelito recently when Grubb No. 15 was placed on production. With 1010 ft. of formation open to bottom at 6525 ft., the well was brought in as a clean producer of 30 gravity oil. Beaning back to conform with curtailment, the last reported gauge was 648 bbls. of oil and 580,000 cu. ft. of gas through a 12/64 in. orifice. Flow pressure was 1015 lbs. while casing pressure registered 1675 lbs.

Present plans call for the employment of only one string of tools by the company and equipment is being moved to Well No. 16, derrick for which is already up.

You are reading the Pacific Coast oil men's home paper.

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
Santa Barbara County					
Betteravia	Union Oil Co., Pezzoni	1	33, 10-35		Grading roads
Carreaga	Arnold Oil Corp., Arnold-Apache	2	8, 8-33	6825	Idle
Goleta	Hamilton, W. C., Hollister	1	3, 4-29	1345	Idle
Lompoc	Sun-Bell Drilling Co.	1	28, 8-34	3064	Idle
Summerland	Oil Group, Inc., Hyland	1	16, 4-26	2286	Drilling
San Luis Obispo County					
Arroyo Grande	California Fuel Oil Co., Elberta	3	5, 32-13	625	Drilling
	Holly Oil Co., Meherin	1	7, 32-13	2870	Drilling
Elk Horn	Calif. Pet. Prod., Irons	1	19, 10-24	2527	Bailing water
	Burrhus, V. E., Haberkern	1	21, 32-22	2730	Idle
Huasna	Gilmore Oil Co., Huasna Comm.	1	11, 32-14		Grade
Ventura County					
Conejo	Sulphur Springs Oil Co., Janss	1	33, 2-19	3000	Idle
Moorpark	Shafer, Frank, et. al.	1	30, 3-19	736	Idle
Piru	Sannes, K. Sande, Janes	1	21, 5-18		Grading roads
Santa Susana	K. C. Oil Co., Marr	1	32, 3-17	1014	Idle
Sespe	G. E. Development Co.	7	13, 4-19	725	Drilling
	Merchants Pet. Co., Cochrane	8	1, 4-20	2011	Cleaning out
	Hall, Henry Lynn, Tar Creek	1	35, 5-19	1275	Idle
	Renard Oil Co.	1	6, 4-19	1100	Idle
	Rio Hondo Oil Co., Cosby	1	14, 4-19	1175	Std. Cem.
Simi	Levesque, G. M., Robertson	1	17, 2-18	2325	Idle
	Ohio Oil Co., Vail	1	10, 2-19	5714	Abandoning
South Mountain	Albatross Oil Co., Schiefferle	1	17, 3-20		Rig
	Mallon, Felix, Richardson	1	14, 3-21		Rig
Sulphur Mt.	Madison Oil Co.	1	24, 4-22		Rig

JENSEN units lifting 250 barrels of oil daily through 2" tubing with ¾" rods from around 2000', using eighteen 36" strokes per minute. Shot in Illinois, but JENSEN Jacks are also saving money for California producers right under your nose. Costs nothing to investigate. Why don't you?

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. . . you will find (if you look!) that JENSEN Jacks are lifting oil for less money than it's costing you.

And why not? We are the oldest and largest exclusive manufacturers of pumping equipment in the world.

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(Continued from Page 19)

(4) globe weighing; (5) gas analysis; (6) effusion method; and (7) the determining of specific gravity by indicating and recording gravitometers. The apparatus for carrying out each of the tests is described and the description is fully supplemented with notes on calibration. The effect of water vapor on the determination of specific gravity is also covered and comments are given on the application of temperature corrections, the use of mercury columns and purification of air. Those desiring to obtain a copy of the bulletin are advised to communicate with George L. Tyler, Secretary, California Natural Gasoline Association, 510 West Sixth Street, Los Angeles, California. Price of the bulletin is $2.50 to non-members and $2.00 to association members.

Members of the committee which prepared the bulletin are W. L. Cowan, Union Oil Company, chairman; P. E. Beckman, Pacific Gas & Electric Co.; Art Bennett, Kettleman North Dome Ass'n.; Frank J. Colton, Tide Water Associated Oil Co.; W. C. Dayhuff, Standard Oil Co. of Calif.; R. N. Donaldson, Standard Oil Co. of Calif.; George H. Forster, The Texas Company; C. B. Heartwell, Standard Oil Co. of Calif.; P. W. Hill, Foxboro Meter Company; C. L. Hutchings, Tide Water Associated Oil Co.; Mark McIlvaine, Chanslor-Canfield Midway Oil Co.; L. C. Miller, Signal Oil & Gas Co.; G. B. Reece, Southern Counties Gas Co.; J. A. Smith, The Texas Company; E. P. Valby, Richfield Oil Corp.; and B. G. Williams, Southern Calif. Gas Co.

California Fuel Oil Co. Drills Arroyo Grande Well

Resuming operations after a period of idleness following a technical spud, California Fuel Oil Co. is drilling Elberta No. 3 below 700 ft. in the Edna-Arroyo Grande field of San Luis Obispo county. The well is located on the Rauschenplat property upon which well No. 1 was drilled 12 years ago.

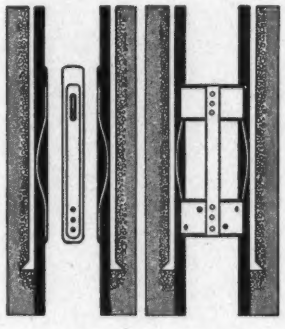
Pismo Cores Show Oil in Fractures

With oil showing in the fractures of hard brown shale cores, Holly Oil Co.'s Meherin No. 1 at Pismo Beach is now one of the most interesting wells in the Coastal area. Though dips have been steeper than anticipated, the project at last reported depth of 2800 ft. was still considered to appear encouraging.

Security Drillable Liner-To-Casing Contactors

Security Casing Contactors are used in connection with installations of Securaloy Drillable oil well liners to shunt electric currents flowing between liner and

(Left) Design A-1465 Contactor
(Right) Design B-1465 Contactor
(Bottom) Contactors in position



casing, and can be used either for cemented or uncemented liners. In the case of cemented liners, the contactors also centralize the liner to permit even distribution of cement.

Design A-1465 casing contactor mounts directly on the liner and is used where the clearance between liner and casing is slight. Design B-1465 casing contactor is a standard slip-over type, available to fit any size liner and is used when the clearance between liner and casing is sufficient to pass the contactor collars.

Security Liner-to-Casing Contactors are designed for removal with a drilling bit so that their assembly on a Securaloy liner does not impair the drillability of the installation.

Wildcat Activity Light In Santa Barbara County

At very nearly the lowest point in years is wildcat activity in Santa Barbara county. The suspension of work by W. C. Hamilton at Goleta leaves Oil Group, Inc. at Summerland the only project working on the entire stretch of coastline. Located nearly a mile back from the beach in sec. 15,4-26, this well is approximately 2350 ft. deep in Sespe shale.

Union Oil Co. is grading location for Pezzoni No. 1 in sec. 33,10-35 near Betteravia. Scheduled as a try for Monterey Shale production, this one will be carried to the Franciscan schist basement if no production is found.

No work has yet been done by Republic Petroleum Co. on the Hollister property near Gaviota where rumor has it that a test will be made of the Vaqueros sands which produced gas for Western Gulf Oil Co., Gaviota Oil Co. and Wilshire Oil Co. Though gas was found in all these wells, prolonged trials showed it to be non-commercial in quantity at the locations tested but proved the general area worthy of further drilling.

Near the Capitan field, H. R. Hamilton is reported planning a shallow test.

Shiells Canyon Well Proves Sensation

Quite a sensation was caused by the performance of Santa Clara Oil Co.'s Calumet No. 15, a deepening job in the old portion of the Shiells Canyon field. Using oil as circulating fluid to avoid mudding off low pressure sands, the old hole was deepened from 2800 ft. to 3224 ft., where, on pulling drill pipe, the well started to flow 35 gravity clean oil at a 300 bbl. per day rate. No electric log had been run and, due to the use of oil as drilling fluid, no cores had been taken. The well is located in sec. 3,3-19.

You are reading the Pacific Coast oil men's home paper.

There is a strong trend toward these compact power installations which feature portability and flexibility. They answer one of the wildcatter's major problems—versatility.

Tide Water Associated Pacific Coast Meetings

During the month of April executives of the home office of Tide Water Associated Oil Co.'s Associated Division in San Francisco will conduct a series of sales show meetings throughout the Pacific Coast marketing territory of the company.

W. A. Reanier

Daytime meetings, to be held in key cities, will be devoted to an intensive discussion of 1940 merchandising and advertising plans. Nine members of the home office group of company executives will meet with sales agents, distributors and members of the field sales personnel in each of these daytime sessions.

In the evening in each city to be visited by the Spring sales show, dealers will be brought in to enjoy the lighter part of the program and to share in a pre-view of the company's advertising and sales promotion plans. The presentation is declared to be the most unique ever taken on the road by a sales organization on the Pacific Coast. Using the largest black art cabinet ever constructed, the show will pay tribute to the magical fraternity and their inexhaustible store of mystery and art. Two hours of fast moving magical entertainment, interspersed with dynamic sales talks by company executives, will serve to make the 1940 Associated sales show one to be long remembered.

W. A. Reanier, domestic sales manager of the company's Associated Division, will be the leader of the home office group of executives staging the shows throughout the Pacific Coast territory served by Associated. Others will include H. A. Jackson, manager of white oil sales; H. R. Deal, manager of advertising and sales promotion; R. J. Irvin, supervisor of reseller accounts; F. L. Wagar, manager of automotive oil and grease sales; Walter Brunn, merchandising manager of service stations; J. A. Ransford, supervisor of sales training and education; C. F. Becker, supervisor of motor laboratory and R. Russell, account executive of Lord & Thomas advertising agency.

The schedule of meetings to be held follows: April 1, San Jose Calif.; April 2, Fresno, Calif.; April 4, San Francisco, Calif.; April 8, Los Angeles, Calif.; April 9 San Diego, Calif.; April 10, Riverside, Calif.; April 12, Phoenix, Ariz.; April 15, Sacramento, Calif.; April 17, Portland, Ore.; April 19, Seattle, Wash.; April 22, Spokane, Wash.; April 24, Boise, Idaho; April 27, Medford, Ore.

Roland E. Smith Joins Grant Oil Tool

Roland E. Smith has joined the Grant Oil Tool Co. organization in the capacity of factory foreign sales representative, and will maintain headquarters at the firm's offices at 2042 East Vernon Avenue, Los Angeles, Calif.

Roland E. Smith

Mr. Smith is well known among the oil fraternity. He was formerly associated with John H. Baird in New York in foreign representation of various lines of oil field equipment, and previous to that time was connected with the Byron Jackson Co. in foreign and domestic sales work, including field service for the Company in California.

His outside activities cover a wide range of interests, including membership in the Los Angeles Chapter of Nomads, fellow members of which—as well as his many friends—wish him success in his new duties.

Lunkenheimer Exhibit At Tulsa Oil Show in May

The Lunkenheimer Co., Waverly Ave. and Beekman St., Cincinnati, Ohio exhibit at the International Petroleum Exposition, May 18-25, in Tulsa, Okla. will occupy booths Nos. 67 and 68 Oklahoma Bldg.

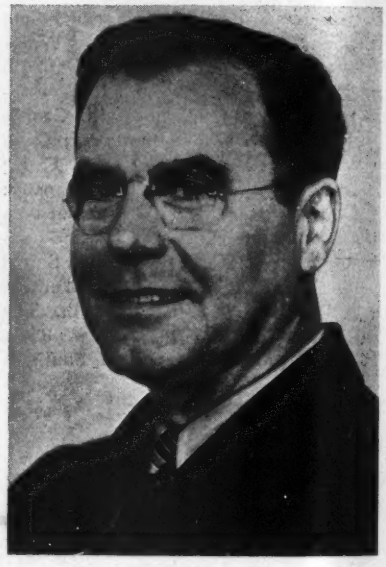
Representatives of the company in attendance will be: Harry A. Burdorf, sales manager; Jos. Waldeck, Elmer R. Tieberman, D. R. Davis, Marshall N. Stickel, Jos. A. Birkhead, and E. P Lunken, sales representatives.

The Lunkenheimer exhibit will consist of Bronze, Iron, Steel and Corrosion Resistant Alloy Valves, Lubricating Devices, Cocks, etc. for use in the petroleum industry. Sectioned models of many of the valves will be shown.

Shaw Notes Increased Grant Oil Tool Exports

John B. Shaw, general manager of the Grant Oil Tool Co., Los Angeles, has just returned from a trip to New York. While on the Atlantic Coast, he contacted the eastern buying offices of a number of the firm's clients, and on the way back visited many of Grant Oil Tool Co.'s clients in the Mid-Continent area.

Mr. Shaw is highly enthusiastic over trade possibilities in South America, and particularly so regarding the Grant Oil Tool Co.'s prospects in that field, since the consistent development program launched some time ago has increased the volume of export business appreciably, with every indication that the steady incline in sales will continue.



John B. Shaw

Colonel Rockwell Elected Bank Director

Col. W. F. Rockwell, president of the Pittsburgh Equitable Meter Co. and Merco Nordstrom Valve Co., has been elected a director of the Commercial National Bank and Trust Co. of New York.

You are reading the Pacific Coast oil men's home paper.

Roller Kelly Drive Bushing Made For Hexagonal Kellys

A new roller kelly drive bushing for hexagonal kellys called the Type 2RH has just been announced by the Baash-Ross Tool Co. This new bushing, de-

signed for use both in regular drilling and when drilling through packers under pressure, has been constructed with fundamental changes in kelly bushing design to allow more sensitive feeding action, more accurate weight indications, and to prevent binding, tearing, or galling the kelly.

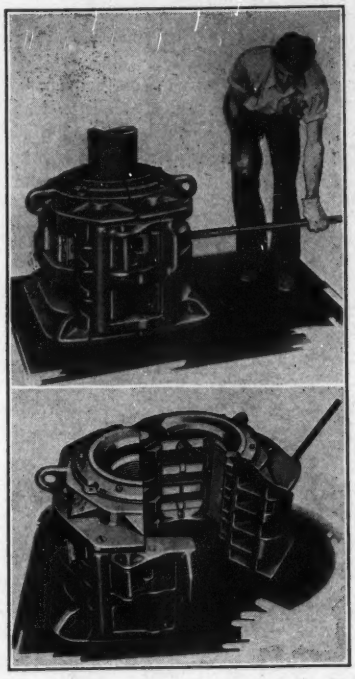
The Baash-Ross 2RH Roller Kelly Drive Bushing contains six sets of rollers, each set consisting of two extra large diameter, hardened rollers which alone contact the driving faces of the kelly and are of such size as to absorb any torque loads now encountered without corrugating the kelly. These rollers ride on inexpensive, replaceable roller bushings which absorb virtually all of the wear that occurs. The replaceable bushings, in turn, roll on large diameter pins which, being reversible, add double pin life to the roller kelly drive bushing.

Because a hexagonal kelly is more nearly round in section than a square kelly, the six roller assemblies of the Baash-Ross 2RH Roller Kelly Drive Bushing are adjustable so that all of the 12 extra large rollers are kept in close contact with the kelly faces to prevent rounding the kelly corners. The recesses for the roller assemblies in the drive bushing body and the backs of the roller assemblies are correspondingly tapered. The roller assemblies seat upon semi-circular flat shims, and adjustment in size of the hexagonal opening to fit the kelly can be made by the addition or removal of shims.

Further information about the new Baash-Ross 2RH Roller Kelly Drive Bushing for hexagonal kellys is available in a bulletin by writing to the Baash-Ross Tool Co., 5512 Boyle Avenue, Los Angeles, Calif.

Byron Jackson Casing Spider

A new split type casing spider with a rated capacity of 300 tons recently has been developed by Byron Jackson Co. This casing spider is made of alloy steel



completely heat treated, and is the split type with a strong hinge pin joining the two halves of the body in the rear. In the front, on one half of the body, is a massive stirrup-type latch similar to an elevator latch which fits over large lugs on the other half of the body, and is double-locked in the closed position by a latch lock.

The casing is supported in the spider by 4 slips, each slip being 18 in. in length. The teeth of these slips are designed and cut to grip the pipe uniformly without crushing or bottle-necking the casing even under the heaviest casing loads. All four slips are so balanced in normal operation that they automatically move into gripping position, and set positively and uniformly with a minimum of vertical travel even when the pipe is over- or under-size.

The slips have a flat back to provide the same gripping action regardless of their vertical position in the body of the spider. A top guide plate of corresponding size with the slips prevents the casing from dragging across the face of the slips when running in.

Operation of the BJ Casing Spider is accomplished by moving a single lever which opens all four of the slips simultaneously. When running casing, one of the crew holds the lever in a lowered position so that the slips are retracted and not engaged on the pipe. In the event a falling object, or a similar accident necessitates the crew hurriedly leaving the derrick floor, the slips set instantly when the operator releases the lever. This automatic feature prevents possibility of dropping the string of casing. A lock is provided for keeping the slips up in the retracted position, if desired.

When the slips are in engaged position, a lug on the end of the operating lever drops into a slot in the latch, thus providing an additional lock and making it impossible to open the latch while the slips are supporting the casing. Another safety feature is the fact that the slips must be in the retracted or non-gripping position before the latch can be opened. When the latch is released and the spider is opened, a trip holds the slips in non-gripping position.

This Spider accommodates all sizes of casing from 5" to 13⅜" A.P.I. by merely changing the slips which is accomplished by removing the one bolt which holds each slip in place; no other operating mechanism need be disturbed.

Further details about the BJ Casing Spider may be secured from Byron Jackson Co., P.O. Box 1307, Arcade Station, Los Angeles, California.

Macwhyte "Safe-Lock" Wire Rope Terminals

These terminals are available in eye end, fork end, turnbuckle end, and stud end types.

They are specially valuable where a trim, efficient, safe fitting is needed on wire ropes that operate or control machinery.

Because socketing with zinc or splicing is not employed in making the attachment, these "Safe-Lock" Terminals are small and compact. The metal in the terminal is "married" to the wire rope, thus they develop the full strength of the rope.

Macwhyte Co. have been suppliers of these terminals in Stainless Steel for control cables on aircraft and are now making these available in a complete range of sizes for general industrial uses.

Macwhyte "Safe-Lock" Terminals are made in both Stainless Steel and Nickel Steel and can be supplied attached to wire ropes of Stainless Steel and Monel Metal, as well as standard steel ropes. They can be made into specification lengths of wire rope. Address Macwhyte Wire Rope Co., 14th Ave., Kenosha, Wis.

You are reading the Pacific Coast oil men's home paper.

Regan Improved 600-Ton Crown Block

To handle the heaviest derrick loads in deep drilling, Regan engineers developed a 600-ton capacity Crown Block, Type EH. Additional improvements have

been added to amplify the structural strength. The cross beams are now welded to heavy plates, forming the most rigid assembly.

This Crown Block, Regan engineers say, is constructed to meet the need for a simple, continuous, over-and-over reeving using large diameter sheaves. It is equipped with six or seven 48" diameter sheaves, grooved for 1", 1⅛" or 1¼" diameter wire line, as desired. There are no castings with the exception of the sheave, and the spacers between the sheave beams. The remaining parts are all of rolled steel plates and I-beam sections. The Regan principle of double bearings with integral pins rotating with the sheaves is embodied in this improved Crown Block. Catline or swabbing line sheave attachments can be furnished for Type EH. Additional details will be furnished by Regan Forge & Engineering Co., P.O. Box 150, San Pedro, Calif.

A New Magnetic Method For Orienting Deflecting Tools

This new method of accurately orienting deflecting tools at the bottom of bore holes developed by Sperry-Sun Well Surveying Co., is not only extremely accurate, requires less time than heretofore known methods, but also provides a positive photographic check of the actual position of the deflecting tool at the bottom of the hole, say Sperry-Sun engineers.

The orientation is accomplished by the use of a non-magnetic sub, Figure 1, containing two small magnets and provision for seating a directional magnetic single shot instrument. The sub is arranged in the drill string assembly immediately above the deflecting tool to be oriented. The relative azimuthal angle between the magnets of the non-magnetic sub and the direction of the tool face is measured prior to lowering the drill string in the same manner as an ordinary bit into the hole. After the tool has reached bottom and prior to setting it, a record is taken with a directional single shot magnetic instrument in which a second compass unit has been temporarily interchanged for the inclination unit. Since the second compass is located directly opposite the magnets in the sub, this record indicates not only the magnetic North, but also the relative position of the deflecting tool to the magnetic North. A picture of the sample record is shown in Figure 2. The magnetic North, shown by the letter N and the position of the deflecting tool, W-73-S, is indicated by the section of the white needle with the round black circle. The drill pipe is then rotated to bring the deflecting tool into the desired position, and another single shot record is made to check on the final position of the deflecting tool.

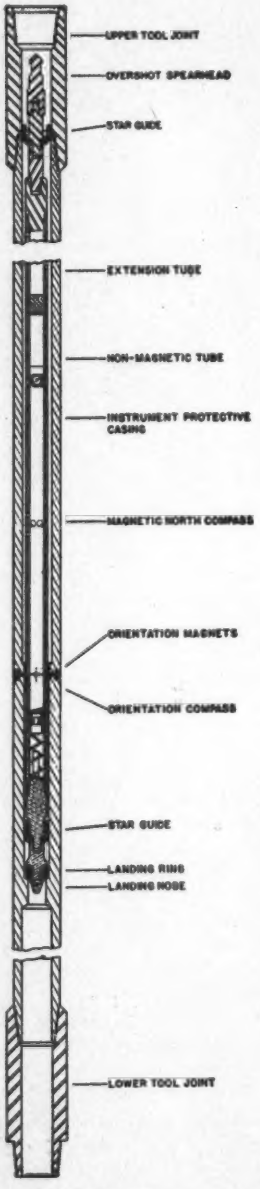


Fig. 1
Non-Magnetic Sub

In holes which have an inclination of more than three degrees (3°), and in which the inclination and the direction of the hole at the point where the deflection is to take place is known from a previous survey, a short magnetic sub, provided with four magnets, and a directional magnetic single shot with one compass and

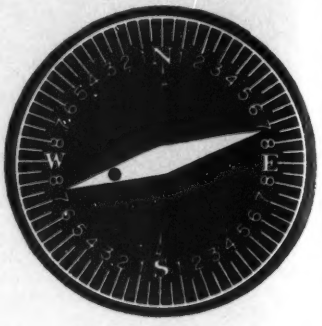


Fig. 2
Sample recorder (showing magnetic North, as well as direction of deflecting tool section of needle with circle indicating direction of tool).

an inclination unit, is used. The record taken inside of the magnetic sub shows the inclination and relative position of the deflecting tool to the direction of the inclination. Since the direction of the inclination is known from the previous survey, the direction of the deflecting tool can be easily determined.

This method has been successfully used in the field for over a year. Correct bottom hole orientation of the deflecting tool to within one-half of a degree (½°) in azimuth can be obtained. The method is speedy, as it is not necessary to orient the drill pipe and the drill string assembly can be lowered as fast as the equipment and the crew permit. It also provides the operator with a photographic check picture of the position of the tool prior to starting the deflecting work. The method is available to producers and directional drilling contractors under license.

Full information and details can be secured from the Sperry-Sun Well Surveying Co., 1608 Walnut Street, Philadelphia, Penn.

Paul P. Daniel Returns From Mid-Continent Fields

Paul P. Daniel of the Daniel Orifice Fitting Co. has recently returned from Houston where he opened an office located at 5644 Navigation Blvd. Mr. Daniel made a six-week survey of activities in the Coastal and Mid-Continent oil fields.

You are reading the Pacific Coast oil men's home paper.

PRODUCTION :-: DEVELOPMENT

(Figures of Production and Stocks are in barrels of 42 Gals.)

	Total Production January	—DAILY AVERAGE— Jan., 1940	Dec., 1939	Jan., 1939
Group No. 1				
Arvin	79,392	2,561	2,389	.....
Belridge—North	349,880	11,287	11,785	12,546
Belridge—South	56,763	1,831	1,142	1,114
Canal	181,030	5,840	5,922	3,031
Canfield Ranch	1,845	60	68	32
Coalinga	676,003	21,807	21,214	9,656
Cole's Levee	73,409	2,368	1,854	171
Edison	68,354	2,205	2,216	2,509
Elk Hills	326,874	10,544	12,166	10,087
Fruitvale	187,534	6,050	6,140	7,087
Greeley	100,591	3,245	2,878	2,080
Kern River	361,140	11,650	11,527	11,246
Kettleman Middle Dome	.....	.....	.....	37
Kettleman North Dome	1,495,418	48,239	52,287	58,383
Lost Hills	129,189	4,167	3,361	3,238
McKittrick	108,437	3,498	3,551	3,702
Midway-Sunset	1,621,485	52,306	50,769	55,665
Mountain View	231,441	7,466	7,277	8,795
Mount Poso	302,047	9,743	10,755	13,524
Paloma	5,605	181	174	.....
Rio Bravo	239,983	7,741	7,974	7,886
Round Mountain	239,921	7,739	8,035	12,109
Strand	40,651	1,311	1,159	.....
Ten Section	262,890	8,480	8,328	8,743
Tupman	30,147	972	1,029	304
Wasco	34,567	1,115	1,115	702
Wheeler Ridge	9,770	315	329	381
Group No. 2				
Capitan	62,664	2,021	2,082	2,740
Elwood	121,472	3,918	4,039	4,642
Rincon	127,801	4,123	4,019	3,846
San Miguelito	90,735	2,927	2,930	2,482
Santa Barbara	8,151	263	268	342
Santa Maria	105,797	3,413	3,603	5,436
Santa Maria Valley	333,668	10,763	11,195	11,177
Summerland	887	29	27	20
Ventura Avenue	1,148,054	37,034	36,418	33,678
Ventura-Newhall	220,101	7,100	6,789	5,516
Watsonville	775	25	30	30
Group No. 3				
Brea-Olinda	174,036	5,614	5,540	5,600
Coyote—East	94,265	3,041	2,900	2,584
Coyote—West	217,943	7,030	6,232	7,915
Domingues	608,424	19,627	18,901	21,715
El Segundo	83,664	2,699	2,782	4,003
Huntington Beach	849,833	27,414	27,921	27,475
Inglewood	401,305	12,945	13,067	12,933
Lawndale	1,320	43	46	62
Long Beach	1,427,733	46,056	44,334	49,220
Los Angeles-Salt Lake	16,810	542	520	497
Montebello	830,166	26,779	27,093	14,564
Playa Del Rey	135,689	4,377	4,494	5,347
Potrero	49,204	1,587	1,301	928
Richfield	271,703	8,765	8,639	8,131
Rosecrans	293,783	9,477	10,004	14,990
Santa Fe Springs	803,747	25,927	26,039	29,752
Seal Beach	224,992	7,258	6,965	7,633
Torrance	412,103	13,294	13,165	19,695
Whittier	30,059	970	1,006	988
Wilmington	2,599,149	83,844	85,001	83,875
Total	18,960,399	611,626	612,794	621,744
December	18,996,615	612,794		
Decrease	36,216	1,168		

	New Rigs Up	Producers Active Drilling	Completed	Daily Initial Output	Active Producing	Abandoned Wells Drillers	Abandoned Wells Producers
Group No. 1							
Arvin	..	1	....	....	13	....	....
Belridge—North	2	....	2	824	76	....	....
Belridge—South	..	....	....	....	145	....	....
Canal	..	2	....	....	31	....	....
Canfield Ranch	..	....	....	....	1	....	....
Coalinga	4	16	6	10,097	923	1	....
Cole's Levee	1	8	2	992	16	....	....
Edison	1	2	....	....	92	....	....
Elk Hills	..	....	....	....	193	....	....
Fruitvale	..	1	....	....	172	....	1
Greeley	..	5	....	....	21	....	....
Kern River	3	3	4	21	1,605	....	....
Kettleman Middle Dome	..	....	....	....	....	....	....
Kettleman North Dome	4	15	7	11,712	246	....	....
Lost Hills	..	....	....	....	348	....	....
McKittrick	..	1	....	....	200	....	....
Midway-Sunset	3	4	3	408	2,612	....	5
Mountain View	1	1	....	....	184	1	....
Mount Poso	1	....	....	....	272	....	....
Paloma	..	2	....	....	1	....	....
Rio Bravo	3	4	2	3,579	40	....	....
Round Mountain	1	1	1	240	218	....	....
Strand	..	2	1	1,954	7	....	....
Ten Section	3	2	2	6,314	40	....	....
Tupman	..	3	1	1,865	6	....	....
Wasco	1	2	1	3,300	8	....	....
Wheeler Ridge	..	....	....	....	33	....	....
Group No. 2							
Capitan	..	....	....	....	43	....	....
Elwood	..	....	....	....	81	....	....
Rincon	1	....	2	277	59	....	....
San Miguelito	1	1	1	1,572	22	....	....
Santa Barbara	..	1	....	....	24	....	1
Santa Maria	..	....	....	....	157	1	....
Santa Maria Valley	..	3	1	1,190	64	....	....
Summerland	..	....	....	....	9	....	....
Ventura Avenue	2	9	3	3,722	302	....	....
Ventura-Newhall	3	4	3	3,547	550	....	....
Watsonville	..	....	....	....	7	....	....
Group No. 3							
Brea-Olinda	1	....	....	....	356	....	....
Coyote—East	..	....	2	491	83	....	....
Coyote—West	..	....	....	....	65	....	....
Domingues	1	3	1	62	177	....	....
El Seungdo	..	....	....	....	47	....	....
Huntington Beach	3	4	2	681	529	....	....
Inglewood	..	....	....	....	209	....	....
Lawndale	..	....	....	....	5	....	....
Long Beach	..	2	1	100	1,221	....	....
Los Angeles-Salt Lake	..	....	....	....	111	....	....
Montebello	7	18	11	3,886	351	....	....
Playa Del Rey	..	....	....	....	158	....	1
Potrero	..	....	2	872	18	....	....
Richfield	..	1	1	50	304	....	2
Rosecrans	2	5	4	768	140	....	....
Santa Fe Springs	..	....	....	....	568	....	....
Seal Beach	..	1	1	500	119	....	....
Torrance	2	2	....	....	705	....	5
Whittier	..	1	....	....	138	....	....
Wilmington	11	12	13	5,638	779	....	....
Miscellaneous Drilling	7	34	....	....	....	3	....
Group No. 4—Gas Fields							
Buena Vista Lake	..	....	1	Gas	4	....	....
Buttonwillow	..	....	....	....	21	....	....
Chowchilla	..	....	....	....	....	....	....
Delano	2	2	1	Gas	10	....	....
Dudley Ridge	..	....	....	....	....	....	....
Fairfield Knolls	..	....	....	....	....	....	....
Goleta	..	....	....	....	....	....	....
Marysville Buttes	..	1	....	....	3	....	....
McDonald Island	..	....	....	....	5	....	....
Rio Vista	..	....	....	....	22	....	....
Semi-Tropic	..	....	....	....	2	....	....
Tracy	..	....	....	....	5	....	....
January	71	179	82	64,662	14,976	6	15
December	104	187	99	93,489	14,668	23	16
Decrease (*Increase)	33	8	17	28,827	308*	17	1

SUMMARY OF CALIFORNIA OILFIELD OPERATIONS FOR JANUARY, 1940—STOCKS HELD IN PACIFIC COAST TERRITORY BY CALIFORNIA OIL COMPANIES

	Jan. 31, 1940	Dec. 31, 1939	Jan. Changes	Jan. 31, 1939
1. Gasoline-Bearing Crude	35,457,793	35,136,501	+ 321,292	36,831,079
2. Non-Gasoline-Bearing Crude	13,378,972	13,303,091	+ 75,881	16,355,501
3. Unblended Nat. Gas	1,662,478	1,516,033	+ 146,445	2,536,877
4. Gasoline (not including distributing and service stations)	16,918,562	16,128,052	+ 790,510	14,265,941
5. Naphtha Distillates	1,289,515[1]	1,282,484[1]	+ 7,031	1,669,331[2]
6. Gas Oil and Diesel Oil	9,099,950	9,671,299	− 571,349	10,689,438
7. Fuel Oil Residuum	65,990,389	66,886,434	− 896,045	71,245,092
8. All Other Stocks	7,766,883[2]	8,011,354[2]	− 244,471	6,338,218[2]
TOTAL	151,564,542	151,935,248	− 370,706	159,931,477
[1]Estimated amount of unfinished gasoline contained in item 5	1,036,948	1,032,536		1,408,777
[2]Coke included in item 8	1,018,659	976,545		124,576

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Oil Men's Calendar

C.N.G.A. Meeting First Thurs. Each Month.

April

18-19—National Petroleum Assn., 37th Semi-Annual Meeting, Cleveland Hotel, Cleveland, O.

24-26—American Institute of Mining & Metallurgical Engineers, Open Hearth Conference, Pittsburgh, Pa.

May

1-3—Petroleum Industry Electrical Assn., Dallas, Texas.

6-10—American Gas Assn., Natural Gas Section, Houston, Tex.

13-15—American Institute of Chemical Engineers, 32nd Semi-Annual Meeting, Statler Hotel, Buffalo, N. Y.

15-17—Natural Gasoline Association of America, 19th Annual Convention, Hotel Tulsa, Tulsa, Okla.

18-25—International Petroleum Exposition and Congress, Tulsa, Okla.

27-31—American Petroleum Institute, 10th Mid-Year Meeting, Blackstone & Texas Hotels, Fort Worth, Tex.

June

9-14—Society of Automotive Engineers, Summer Meeting, The Greenbriar, White Sulphur Springs, W. Va.

17-20—American Society of Mechanical Engineers, Milwaukee, Wisc.

24-28—American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J.

California Crude Oil Production

Two Weeks Ended March 30, 1940

	March Daily Quota	Average Daily Production	Excess
San Joaquin Valley			
Beiridge—North	11,930	11,297	*633
Beiridge—South	2,022	1,830	*192
Buena Vista	16,539	16,113	*426
Canal	5,732	5,620	*112
Coalinga-E. (Eocene)	13,094	12,989	*105
Coalinga—East-West	15,281	11,065	*4,216
Cole's Levee	4,345	4,386	41
Edison	2,212	2,182	*30
Elk Hills	7,510	12,142	4,632
Fruitvale	5,969	5,244	*725
Greeley	3,656	3,677	21
Kern Front	7,309	5,845	*1,464
Kern River	6,768	4,020	*2,748
Kettleman No. Dome	34,779	48,314	13,535
Lost Hills	3,939	3,928	*11
McKittrick	3,655	3,415	*240
Midway	37,041	28,794	*8,247
Mount Poso	9,648	9,065	*583
Mountain View	8,745	8,948	203
Rio Bravo	7,826	8,120	294
Round Mt. and Coffee Canyon	7,282	7,577	295
Ten Section	8,657	8,742	85
Wasco	1,279	1,422	143
Other Fields	3,560	3,549	*11
TOTAL	228,778	228,284	*494
Coastal Counties			
Elwood	3,641	3,664	23
Rincon	2,501	3,886	1,385
Santa Maria	6,086	4,090	*1,996
Gato Ridge	2,322	352	*1,970
Santa Maria Valley	18,103	11,723	*6,380
Santa Paula-Newhall	5,862	6,448	586
Ventura Avenue	31,103	31,663	560
Other Fields	5,278	5,448	170
TOTAL	74,896	67,274	*7,622
Los Angeles Basin			
Alamitos-Seal Beach	7,174	7,200	26
Brea-Olinda	8,010	5,513	*2,497
Coyote—East	3,405	3,143	*263
Coyote—West	10,008	6,440	*3,568
Domingues	16,599	19,010	2,411
El Segundo	2,447	2,568	121
Huntington Beach—New and Old	22,923	28,253	5,330
Inglewood	12,614	12,871	257
Long Beach	39,212	44,049	4,837
Montebello	5,924	5,243	*681
Montebello-West End	20,389	14,965	*5,424
Playa del Rey	3,926	4,148	223
Richfield	7,106	8,556	1,450
Rosecrans-Athens	7,881	9,258	1,377
Santa Fe Springs	24,162	25,749	1,587
Torrance	5,218	5,146	*73
Torrance "24" and "D & B"	6,502	7,521	1,019
Wilmington	79,391	83,992	4,601
Other Fields	3,940	4,943	1,003
TOTAL	286,831	298,568	11,737
STATE TOTAL	590,505	594,126	3,621

*—Shortage.